EAST ENGINEERING
LIBRARY

MARCH 14, 1946

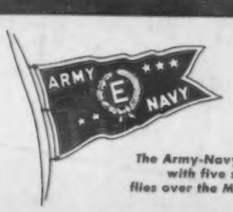
MAR 1 5 1946

Editorial Index, Page 51

THE IRON AGE

FASTEST COLD MILLS IN THE WORLD Built by MESTA

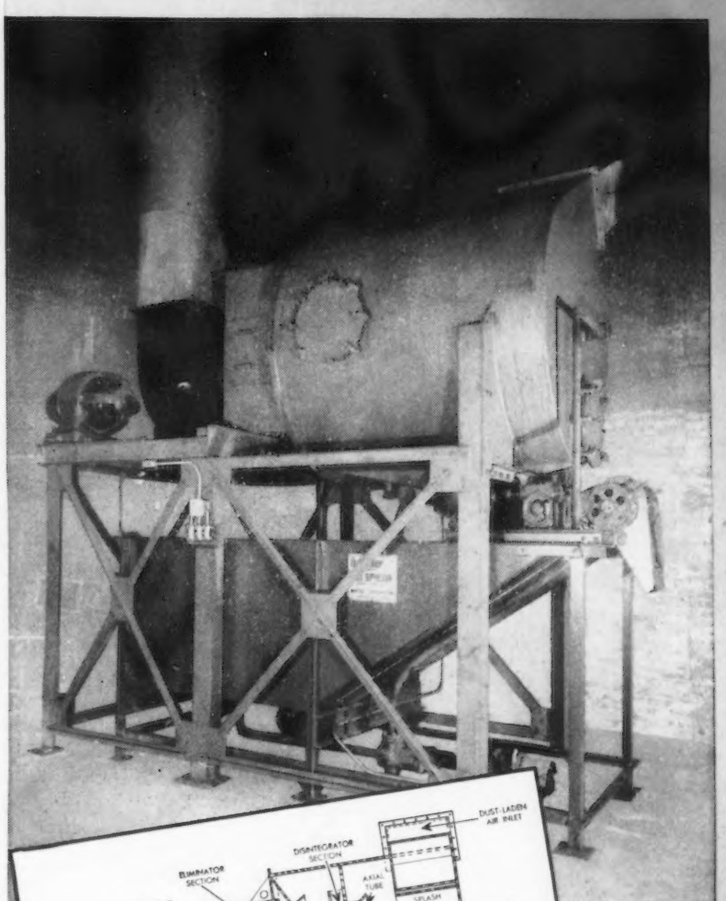
MESTA 42" High Speed Four-High Tandem Cold Mill for Rolling Tin Plate Gauges



The Army-Navy "E" flag with five stars flies over the Mesta Plant

MESTA MACHINE COMPANY · PITTSBURGH, PA.

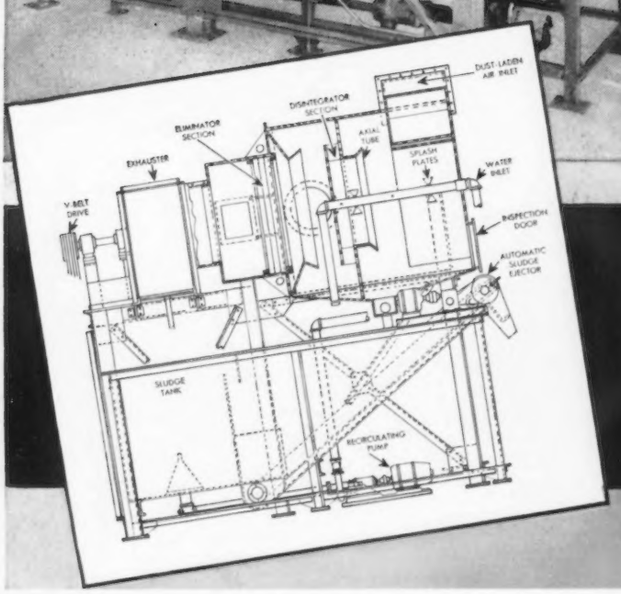
Suppress dust *completely* with a Whiting Hydro-Clone



The Whiting Hydro-Clone operates on a new and different principle. The dust-laden air swirls through a cylindrical chamber where centrifugal force impinges the dust particles at high velocity against copiously washed surfaces.

The resulting sludge settles out in a dewatering tank, and the water can be used over and over again. There are no cloth bags or screens to burn or wear out, and no nozzles to clog. Sludge tanks can be arranged for mechanical ejection if desired.

Hydro-Clones are engineered for a wide variety of applications—snag grinders, sand blasting, tumbling mills, sand handling equipment, shakeouts. Also used to suppress sparks and fly ash from stacks and cupolas. Write today about your dust problems; descriptive literature on request. Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois.



WHITING
CORPORATION
HYDRO-CLONE DUST SUPPRESSION EQUIPMENT

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, and Washington, D. C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 136 Liberty Street, New York 6, New York.

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 157, No. 11.

J. H. VAN DEVENTER
President and Editorial Director
C. S. BAUR
Vice-President & General Manager
H. E. LEONARD
Assistant General Manager
B. H. HAYES
Advertising Manager
O. L. JOHNSON, Manager
Reader Service and Market Research
R. E. BAUR, Production Manager
C. E. ELLIS, Promotion and Research

o o o

Executive Offices
Chestnut and 56th Sts.
Philadelphia 39, Pa., U.S.A.
Editorial and Advertising Offices
100 East 42nd St., New York 17, N.Y., U.S.A.

o o o

Regional Business Managers
C. H. OBER, New York 17, 100 East 42nd St.
H. E. LEONARD, New York 17, 100 East 42nd St.
ROBERT F. BLAIR, Cleveland 14, 1016 Guardian Bldg.
H. K. HOTTENSTEIN, Chicago 3, 1134 Otis Bldg.
B. L. HERMAN, Philadelphia 39, Chilton Bldg.
D. C. WARREN, Hartford 1, Conn., P. O. Box 81
PEIRCE LEWIS, Detroit 2, 7310 Woodward Ave.
FRED BANNISTER, W. Hartford 7, Conn., 967 Farmington Ave.
R. M. GIBBS, Pittsburgh 22, 814 Park Bldg.
R. RAYMOND KAY, Los Angeles 28, 2420 Cheremoya Ave.

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

OFFICERS AND DIRECTORS
JOS. S. HILDRETH, *President*
GEORGE H. GRIFFITHS — Vice-President
EVERIT B. TERHUNE — Vice-President
J. H. VAN DEVENTER — Vice-President
C. S. BAUR — Vice-President
P. M. FAHRENDORF — Vice-President
JULIAN CHASE — Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
G. C. BUZBY, HARRY V. DUFFY
THOMAS L. KANE, CHARLES J. HEALE

o o o

WILLIAM H. VALLAR, Asst. Treas.

o o o

Chilton Editorial Board
PAUL WOOTON
Washington Representative

o o o

Member, Audit Bureau of Circulation

Member, Associated Business Papers

o o o

Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 per year. Single Copy, 35 cents. Annual Review Number $2.00.

o o o

Cable Address, "Ironage" N. Y.

o o o

Copyright, 1946, by Chilton Company (Inc.)

THIS WEEK IN THE

IRON AGE

Vol. 157, No. 11 — March 14, 1946

Editorial

The Taxpayer and the Machine Tool 53

Technical Articles

Borizing Setups Increase Production and Accuracy 56
Wartime Developments in British Machine Tools 61
Heat Treatment of High Speed Steel (Part III) 68
Forming Heavy Plate with Kirksite Dies 74
Impregnating Magnesium Castings 76
New Equipment 81

Features

Newsfront 55
Assembly Line 86
Washington 90
West Coast 94
European Letter 98
Personals and Obituaries 102
Dear Editor 106
This Industrial Week 108
News of Industry 111

News and Markets

European Surplus Materials 115
Gallup Poll 117
New Construction 127
Machine Tool Developments 128
Nonferrous Market News and Prices 130-1
Iron and Steel Scrap News and Prices 132-3
Comparison of Prices by Week and Year 134
Finished and Semifinished Steel Prices 136
Alloy Steel Prices 137
Fabricated Steel Products Prices 138
Warehouse Steel and Pig Iron Prices 139
Ferroalloy Prices 140
Aircraft Scrap Sales 142
CF&I Official Killed 142
J&L Workers Fight Fire 144
Reports 1945 Banner Year 144
Natl. Tube Makes Air Cylinders 146
Steel Price Increases Announced 146
Buffalo Tool & Die Expands 146
Reynolds Metal Leases Aluminum Mill 148
National Acme Reports Profits 150
Urges Continued Price Control 150
Upholds Production with Foreign Sales 152
Stitched Steel Wire Saves Lumber 153
A-C to Release Engineering Review 154
Plans 18-Mile Pipeline 155
C&O to Merge with Pere Marquette 156
M. A. Hanna Reports Income 164
Iron Ore Reserves in Labrador 165
Bethlehem Net Income Declines 167
Monarch Tool Earnings Drop 167
Basis of Metallurgical Education 169
AFA Discusses Defective Castings 171
Foundry Service Awards 172
Wood Nominated AFA President 172

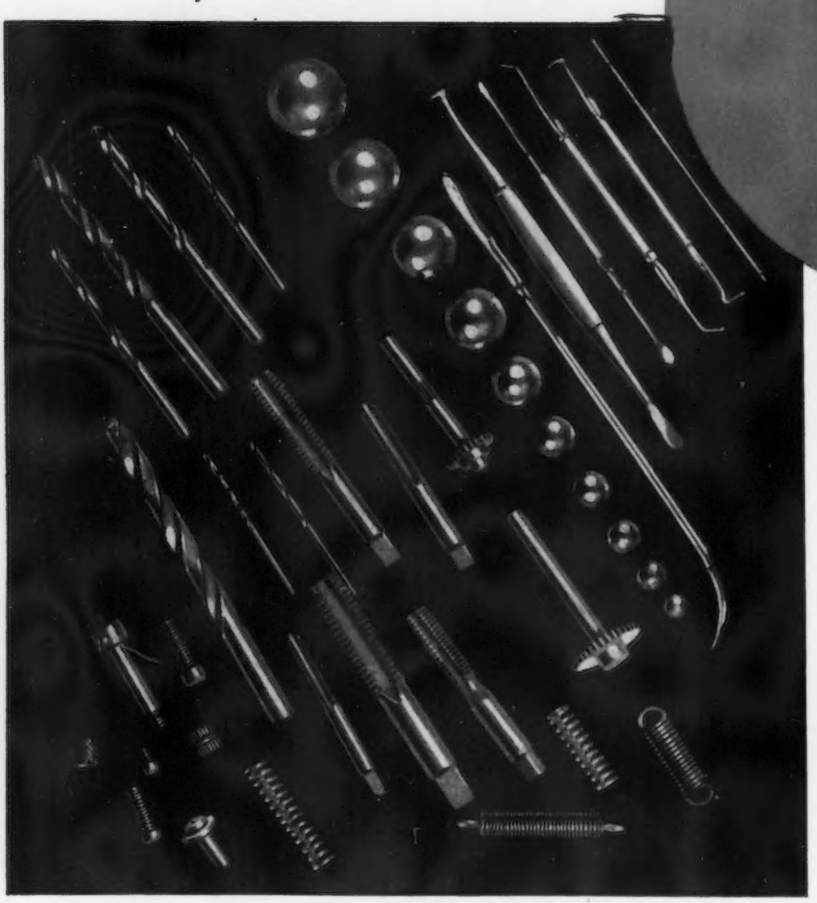
Index to Advertisers 267-68

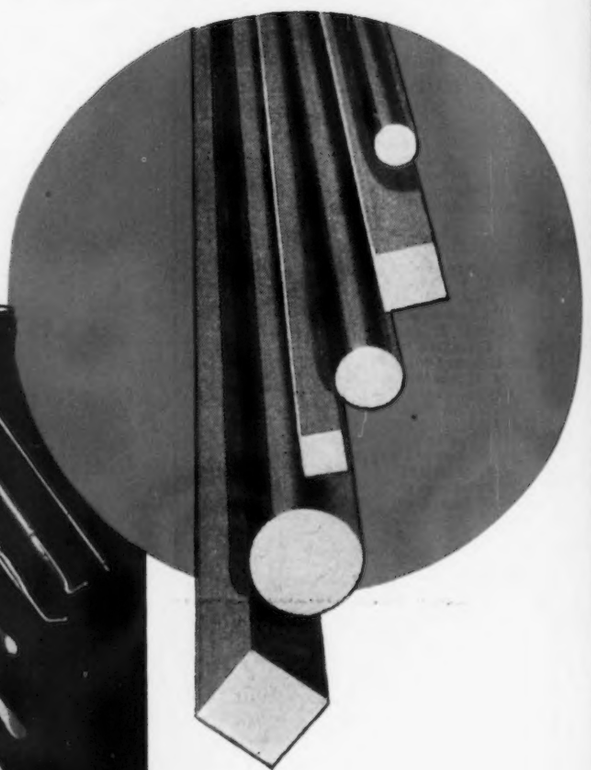
GLOBE DRILL ROD

a

FIRTH STERLING

Product





Available in High-Speed Steels, Tool Steels, Stainless Steels—in Bar, Rod and Wire. It is supplied in various finishes—polished, ground, and rough drawn or rough ground. "A Uniformity of High Quality."

GLOBE WIRE DIVISION

Call **Firth-Sterling**

STEEL COMPANY

McKeesport, Pa. • New York • Hartford • Philadelphia • Pittsburgh • Cleveland • Dayton • Detroit • Chicago • Los Angeles

THE
IRON AGE

ESTABLISHED 1855

o o o

March 14, 1946

o o o

J. H. VAN DEVENTER
President and Editorial Director

C. S. BAUR
Vice-President and General Manager

o o o

Editorial Staff

Editor .....T. W. LIPPERT
News Markets Editor T. C. CAMPBELL
Machine Tool Editor....H. E. LINSLEY

o o o

Associate Editors

W. A. PHAIR
F. J. WINTERS
S. H. BARMASEL
E. S. KOPECKI

Editorial Assistants

M. M. SCHIEN
H. W. VAN CAMP
C. R. MUNZER
J. P. O'CONNOR
E. L. SCHIMKO
E. A. TOWNE
A. J. SPEAR
R. E. BENEDETTO

Foreign Editors

Europe .....JACK R. HIGHT
Canada (Contrib.)...F. SANDERSON

Regional News and Technical Editors

T. E. LLOYD
Pittsburgh 22
814 Park Bldg.

C. T. POST
Chicago 3
1134 Otis Bldg.

JOHN ANTHONY
Philadelphia 39
Chilton Bldg.

L. W. MOFFETT
EUGENE HARDY
KARL RANNELLS, SR.
Washington 4
National Press Bldg.

W. A. LLOYD
Cleveland 14
1016 Guardian Bldg.

S. H. BRAMS
Detroit 2
7310 Woodward Ave.

OSGOOD MURDOCK
ROBERT T. REINHARDT
San Francisco 3
1355 Market St.

Editorial Correspondents

ROBERT McINTOSH
Cincinnati

L. C. DEAN
Buffalo

G. FRAZAR
Boston

HUGH SHARP
Milwaukee

R. RAYMOND KAY
Los Angeles

JOHN C. McCUNE
Birmingham

ROY EDMONDS
St. Louis

JAMES DOUGLAS
Seattle

The Taxpayer and the Machine Tool

A GOOD many people in our country have wrong ideas. One of them is that the machine tools that were bought by Uncle Sam for the Defence Corp. plants are being sold at a loss. And that the little man in the barrel, namely Joe Doakes, is left holding the bag.

I will admit that Joe is used to holding bags, though how he can do it and at the same time keep his barrel in position to avoid personal exposure is another question. Maybe there is room for the bags inside of the barrel.

From the way things figure out, however, I do not think that Joe has much to worry about as to his share of the burden in having equipped our war industries with tools. And neither has Uncle Sam.

For example, along in the early part of March, 1943, Uncle Sam bought a certain machine tool of not an unusual type and had it delivered to the plant of a munitions contractor under the usual terms. The price paid for this tool was $4433.00 and the mazuma to pay for it came out of the U. S. Treasury. Just a drop in the bucket.

Later on, namely in January, 1945, this tool, then being declared surplus, was purchased by a private manufacturer for the sum of $2438.15. On the face of it, the taxpayers would have to dig down in their barrels for the difference, namely $1994.85.

But things are not always what they seem to be and certainly not in this case which is more or less typical of all such cases.

Old Man Renegotiation, for example, entered the picture, crawled through the window of the office of the machine tool builder who built the machine and departed with loot amounting to $1061.70, representing a charge of 23.95 pct.

In addition, the tax collector found the machine tool builder's door open and the safe unlocked and took back to the Treasury the sum of $476.63 as Uncle Sam's share of the 11 pct tax on the sales of the company.

Neither the tax collector nor the renegotiator, however, overlooked any bets so they called on the dealer who handled the sale and extracted the sum of $58.73 or 13¼ pct from his commission.

But wait, dear children, the story is not yet done. The war contractor did not get the use of this machine for nothing. In fact he paid an annual rental for its use to Uncle Sam and that amounted to a total of $1385.30.

So therefore, to wit and whereas Uncle Sam paid out $4433.00 in taxpayer's money in this instance, he received in return the following:

Resale price	$2,438.15
Rental from contractor	1,385.30
From maker and dealer, taxes and renegotiation	1,538.33
Or a total of	$5,361.78

In other words, Uncle Sam made a profit of $928.78 on the deal, which represented a return of his, or rather the taxpayer's, money of approximately 10 pct per annum.

When, as and if that profit is returned to the taxpayer, he can feel that his digging down into the barrel for the purchase price made him a sizable financial return in addition to helping to win the war.

Every Order Must First Pass Metallurgical Control

The Inland metallurgists in charge of control are real critics and every order sent to the mill must first pass them before steel can be processed. They take one order at a time, check to see if it is similar to a previous order; if not, they examine blueprints of the part, and may even call at the customer's plant to study the method and equipment for fabrication. After they have thoroughly studied an order they designate what type of steel is to be furnished, and how it is to be processed.

Metallurgical control is another of the many methods Inland uses to assure the right quality steel for each order entered by a customer. Inland Steel Company, 38 South Dearborn Street, Chicago 3, Illinois.

Principal Products: Sheets • Strip • Tin Plate • Bars • Plates • Floor Plate • Structurals • Piling • Rails • Track Accessories • Reinforcing Bars

Sales Offices: Cincinnati • Detroit • Indianapolis • Kansas City
Milwaukee • New York • St. Louis • St. Paul

INLAND STEEL

THE IRON AGE
March 12, 1946

NEWSFRONT

► New developments in the coloring of stainless steels may be announced soon. In final developmental stages is a non-lacquer process for imparting a gold tone to stainless.

A war-born blackening process for coloring stainless steel by means of a hot dichromate bath has already been described by Rustless Iron and Steel Corp.

► Lower scrap losses, easier cleaning and better grain structures in both ferrous and nonferrous castings are said to result from the use of a newly developed exothermic compound which is inserted in the gate of the mold. Reaction with the molten metal passing through the gate is said to raise the iron temperature, improve fluidity and thus minimize piping and cracking due to secondary cooling.

► Steel operators are rushing to get as high an ingot operating rate as possible before a coal strike slows down production. Most mills are far behind on delivery promises and a coal strike will slow down operations long before supplies of coal are used up when mills cut coke oven output in order to make stocks of coal last as long as possible.

► OPA is bound to get another request from steel companies for price adjustments when coal miners get their increase. Such a wage advance will add to coal mining costs in the steel firms' captive mines.

► Green labor and mental fatigue because of constant bombing and necessary ARP work, were factors in addition to expanded requirements, which necessitated major changes in machine-tool design in Great Britain.

One such development is the Kearns type O.C. three-spindle boring machine as standardized units. This permits rapid and economical production of machines to suit special purposes. Fundamentally such machines are considered as assemblies of 19 basic units; bed, spindle, slide, upright column, trunnion arm, boring stay, drive table, etc. By designing each to be self-contained there are limitless possible combinations.

► Microporosity in light metal castings can be overcome by use of a suitable impregnating process for sealing. Impregnation causes the sealing agent to become a part of the casting.

One compound when mixed with equal parts of styrene gives the proper viscosity for completely sealing nearly all microporosity. On baking, the liquid quickly converts to a gel thus virtually freezing the pores of the casting.

► Kirksite dies, lubricated with a 50-50 mixture of white-lead and lubricating oil, have been successfully used for forming experimental propeller blade plates of $\frac{1}{2}$-in. thick SAE 4330 steel.

► Worn surfaces may be built up with a welded deposit applied by automatic welding, thus cutting cost of repairs to but a fraction of the cost of new equipment. In reclaiming worn brake-drums for oil field machinery approximately 150 lb of $\frac{1}{4}$-in. welding rod was used to rebuild the brake surface to a finished height of 3/8 in.

► Growing order backlogs have troubled the Steel industry and its customers for a long time. Expansion of facilities is already in progress at some plants and should do much to relieve the pressure as soon as the end of the current wave of strikes permits delivery of equipment.

Stainless Steel capacity will be benefited by increases in Ingot and Rolling Mill facilities. Tinplate will get additional hot dipped and electrolytic capacity, and new rolling equipment.

► As early as Feb. 15, the United Steelworkers received assurance of administration acceptance of a wage agreement up to 18$\frac{1}{2}$c per hr covering strikers in the Steel Industry or Iron Ore Mining Industries. However, companies not on strike are required to obtain approval of wage increases by the NWSB.

Borizing Setups Increase Production

TAKEN from actual shop practice, the specific cases described in this article show setups and tooling which increased both production and accuracy on typical machining jobs. Although it is unlikely that many shops will have exactly these parts to make, the principles involved have wide application, and with the use of ordinary ingenuity should prove adaptable to many basically similar problems.

The part sketched in fig. 1 involved machining aircraft knuckle pin locking plates. Under the method originally used, two machines were required. Even so, production was less than needed, and the blending of the radius with the taper face was, at best, unsatisfactory.

All aspects were taken care of satisfactorily with the single-station setup shown in fig. 2. The part is located in a rotating fixture and held by three straps. Three tungsten carbide tipped tools are used. Two of them are mounted in a common tool block, and the third in a cam-controlled tool slide. Both tool block and tool slide are attached to a hydraulic cross-slide.

The cycle is as follows: The table runs in at rapid traverse, slows down to boring feed, and bores a 4.0455-in. diam hole and a 0.06-in. radius. At the end of the boring stroke, the cross slide automatically feeds across, generating the face at the bottom of the 4.0455-in. diam bore with the same tool.

Meanwhile the tool in the tool slide, controlled by a fixed cam on the cross slide base, generates a 14° angular face. At the end of the cross-slide travel a third form tool plunge cuts a 0.13-in. radius blending with the 14° angular face and the 4.0455-in. bore. These operations finished, the table automatically returns to rest position.

About 0.01 to 0.012 in. of stock is removed from the diameters of the part, which is made of steel. About 0.006 to 0.008 in. is removed from the faces. Bore size is held to ±0.0005 in. Squareness, parallelism and concentricity are held to 0.002 in. total indicator reading.

Nine different operations are needed to machine the surfaces on the other side of this part, shown in fig. 3. The tooling arrangement is shown in fig. 4. A machine with two stations is used for performing progressive operations. The work is rotated, and is held by hand-clamping fixtures. The tool blocks are held on a hydraulic cross-slide.

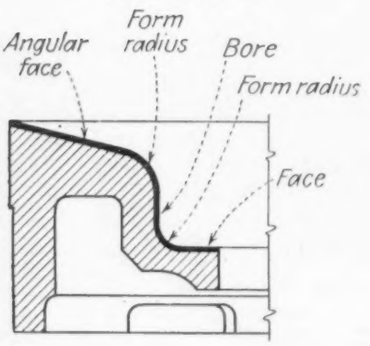
The front tool block holds two tools which bore a 4.686-in. diam counterbore, form a 0.020-in. radius at the end of the counterbore, and plunge form a 0.120-in. radius.

Additional operations are performed in the rear station. One tool bores the 4.644-in. diam outer wall of a circular groove, forms a 0.030-in. radius at the end of this bore, and plunge faces the bottom of the groove. A second tool bores the 4.235-in.

o o o

BELOW

FIG. 1 — Surfaces to be machined on one side of a knuckle pin locking plate.



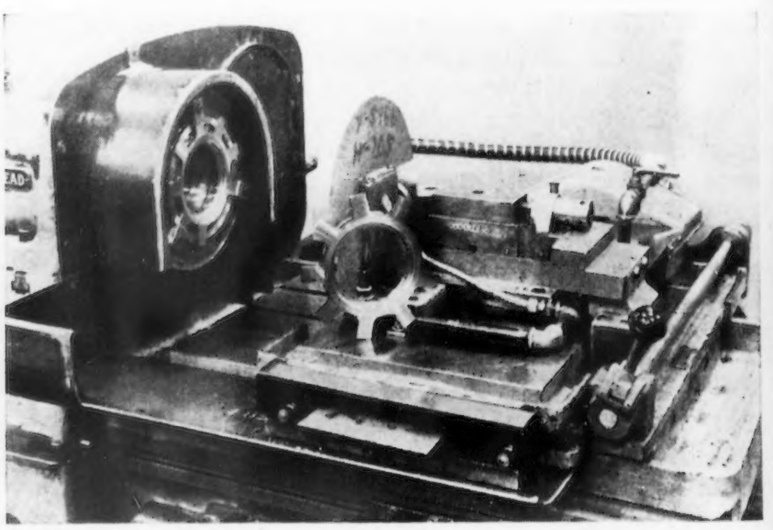


FIG. 2—Borizing setup for part shown in fig. 1. Two boring, facing, and forming tools are carried on hydraulic cross slide. Angular facing tool is cam controlled on special slide attached to main cross slide.

and Accuracy ◆ ◆ ◆

By C. G. NORDMARK
Heald Machine Co., Worcester

Many complicated boring and facing problems can be handled quickly and economically, and with the highest degree of precision, by the use of a little ingenuity and an understanding of the flexibility of borizing equipment. Typical examples, taken from actual production practice, are described herein, and will serve to guide the setting up of basically similar jobs.

diam inner wall of the groove and forms a 0.030-in. radius to blend with the bottom groove face. The third tool plunge cuts a 0.050-in. x 45° chamfer on the inner edge of the groove.

The cycle is entirely automatic, including automatic backoff of the cross-slide for eliminating tool drag lines, and return of the table to rest position.

Refrigerator performance depends largely upon accuracy. This is especially true of the cast iron main frame shown in fig. 5. The cylinder bore must be finished to 1.0613 to 1.0616-in. ID, and the adjacent sealing face with a taper 1.865-in. OD must be tapered concavely 0.010 in. into the bore. A flat outer face concentric with the sealing face is also faced, and a circular groove 0.005 in. deep is cut in it.

To get adequate production, these operations are performed simultaneously on two parts in two identical stations. The parts are rotated in fixtures attached to spindle flanges of the boring heads, mounted on the machine bridge. These fixtures are of the counterbalanced shelf type, and locate the parts from a flanged section, a concentric hole, and from another hole in the flange by a two-way dowel. Clamping is accomplished by air-operated two-point yokes that contact the top of the flange.

Each station is equipped with a boring bar holding two tools, one for rough and one for finish boring the 1.0613-in. bore. The bars are mounted on bridges straddling a hydraulic cross slide. They are of the pivoted dial indicator type that permits fast and accurate tool adjustment, and incorporate means for hydraulic retraction at the end of the boring stroke to prevent tool drag lines when the tools are withdrawn from the finished bores.

Grooving tool blocks also are mounted on the boring bar bridges and are pivoted for tool retraction. Facing tools are held by auxiliary tool slides attached directly to the hydraulic cross-slide. Compound movement produced by cross-slide travel in conjunction with the action produced by fixed cams which contact the auxiliary slides, give the contour stroke required for facing both the concave and flat

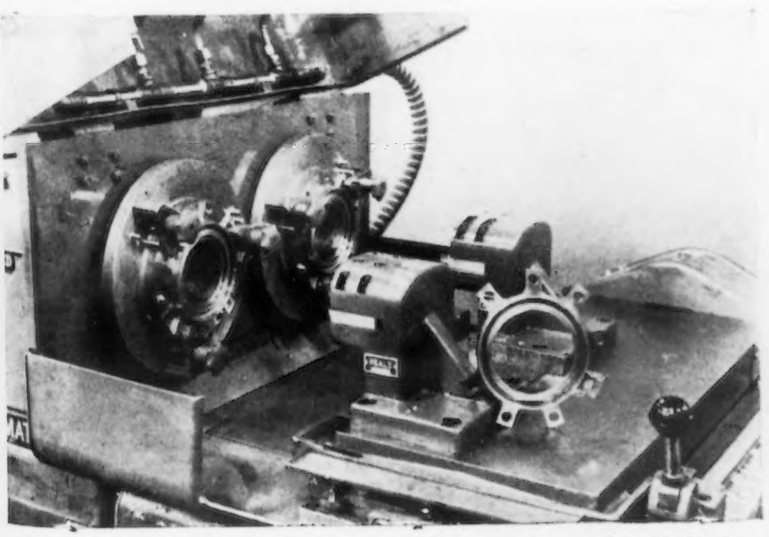
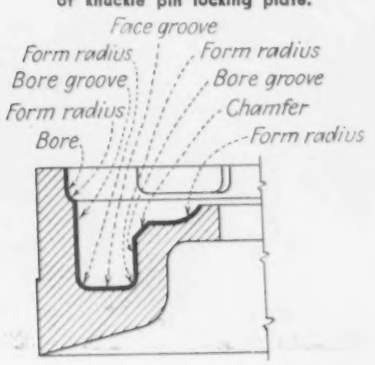


FIG. 4—Special double-head setup for performing the operations shown in fig. 3. Two tools in front block counterbore and form radius; three tools in rear block groove and chamfer.

BELOW

FIG. 3—Multiple operations to be performed on opposite side of knuckle pin locking plate.



areas of the seat. Boring and grooving occur in the table stroke, followed by facing during the cross-slide travel. The entire cycle is automatic.

A difficult boring job is the cast-iron propeller governor cylinder shown in the sketch, fig. 6. It is only 1⅜ in. long, but contains eight 0.1255-in. ID holes, made up of four pairs, each pair in line. The two pairs at each end lie in planes at 90° and spaced 0.0575 to 0.0565-in. apart. The spacing between the second and third pairs is 0.6935 to 0.6925-in. Production and accuracy to the degree required was extremely difficult under the method formerly used, but is achieved with the setup shown in fig. 7. All eight holes are now drilled and bored in a single setting with a single boring head mounted on the machine bridge.

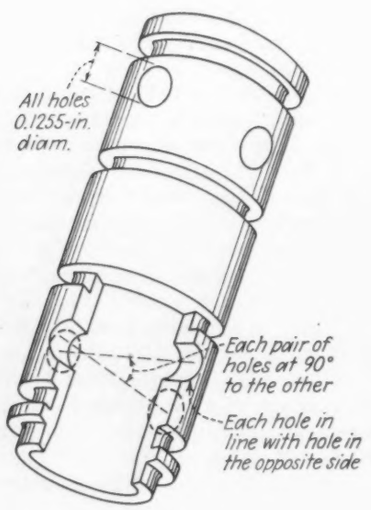
The boring head is equipped with an adapter that holds interchangeable taper-shank drill holders and boring quills which permits quick change between drilling and boring operations. The holes are drilled from the solid and then finish bored with a cut which removes 0.005 in. of stock.

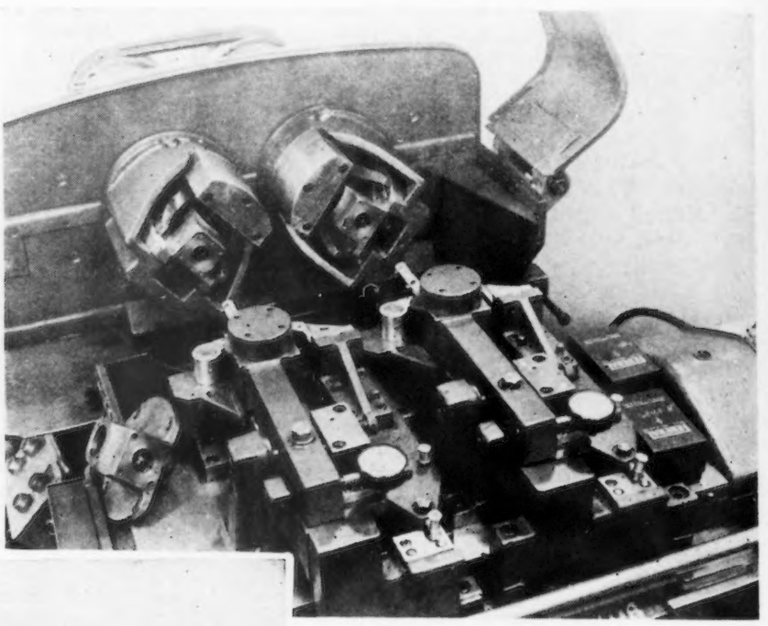
Boring the holes involves both angular and longitudinal indexing. To permit this, the work fixture is of the vertical rotary indexing type, mounted on a horizontal indexing cross slide. The part is located from its bore on a projecting stake of the indexing spindle, and angularly from one of the holes by a sliding locating plug, and is clamped endwise by a pull rod and C washer.

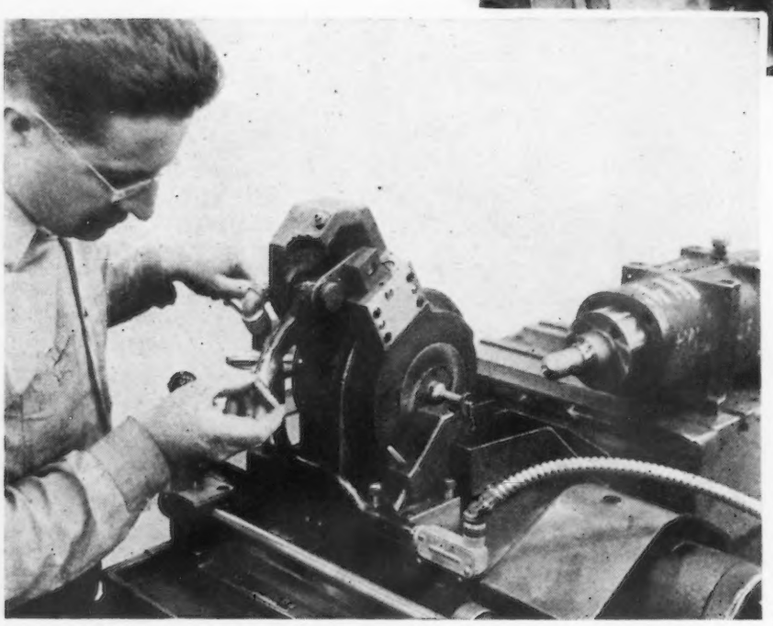
Angular indexing is done manually by rotating the indexing spindle, each indexing position being determined by a lever operated plunger. Horizontal indexing is performed by the hydraulic cross slide, positioning being obtained by a three-position barrel stop. Both fixture and slide are calibrated, matching of similar markings giving quick, positive identification of each index position.

Fig. 8 shows a setup for finishing all surfaces on valve seats. The machine chamfers and turns the OD 2.637-in., bores the ID to 2.123-in., finish chamfers the 45° valve seat, and generates the faces on either side. The material is aluminum bronze.

All operations are done simultaneously, but are







ABOVE

FIG. 5—Refrigerator main frames are machined two at a time in this setup which features automatic tool retraction to eliminate drag lines when tools are withdrawn.

o o o

UPPER LEFT

FIG. 6—This cast-iron propeller governor cylinder demanded high accuracy and very close indexing. It was machined by the setup shown in fig. 7.

o o o

LEFT

FIG. 7—Workpiece is held by a pull-rod and C-washer on a four-position rotary indexing fixture mounted on the cross slide which serves for lateral indexing. Interchangeable drill and boring tool are held in the boring head.

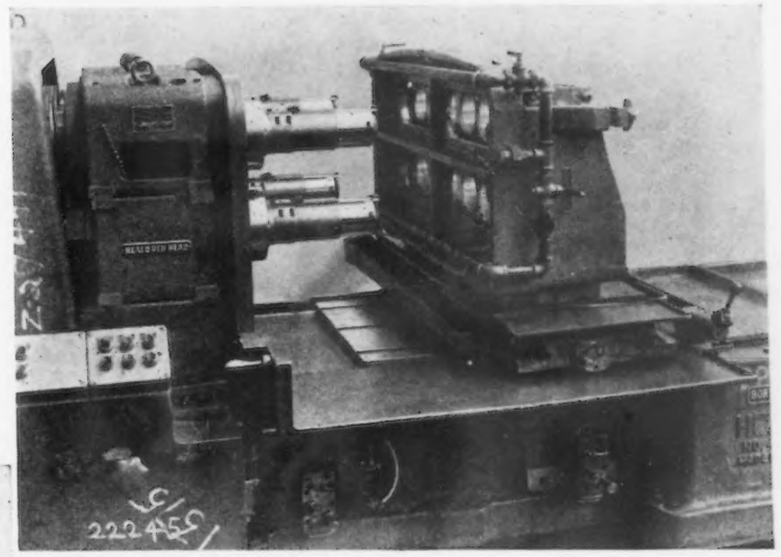
RIGHT

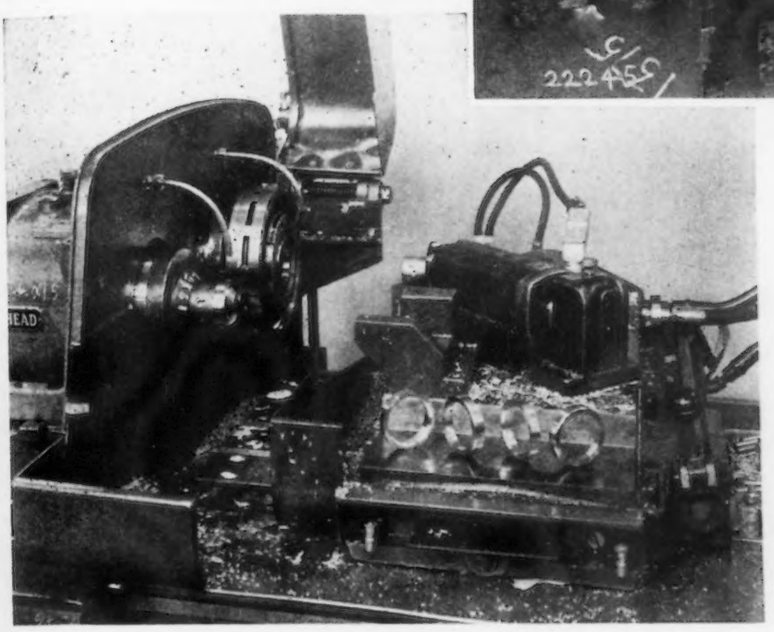
FIG. 9—All 12 bores of this aircraft engine cylinder block are bored and counterbored, four at a time, by means of this four-spindle setup.

o o o

BELOW

FIG. 8—Valve seats are turned and faced on the front station, and bored, chamfered and faced on the opposite side at the rear station on this double-head Bore-Matic.





divided between two stations. Parts are rotated in both stations. The front fixture is a solid stake type with pull-back clamping fingers, and the rear station fixture is of the single diaphragm type.

Tooling for the front station consists of two tools in a block on a hydraulic cross slide. For the rear station the tooling comprises five tools in an auxiliary hydraulic angular slide also attached to the cross slide.

The twelve-cylinder aircraft engine block shown in fig. 9 is bored four cylinders at a time in a single setup with the four-spindle machine arrangement shown. Very close accuracy is required for size, alinement, parallelism, spacing and squareness of bores with the crankshaft bearings.

The quill of each spindle holds to tungsten-carbide tools for boring the cylinders to 5.18625-in. and counterboring the cylinder entrance to 5 25/32-in. The overall length of the cylinders is 9-in.

The cylinder block is held in a fixture that locates it by two dowels in the front face, and clamps it against the front face on four pads by four straps. This fixture is attached to a hydraulic cross slide which is used to index the block between operations.

On completion of boring a group of four cylinders, the boring quill meanwhile remaining in the cut, the operator actuates a lever at the front of the machine which causes all four boring spindles to reverse and stop in three o'clock position by means of roller clutch mechanisms on the four spindles, and also causes the table to reverse a slight amount, thus backing off the counterboring tools from the bottom faces of the cylinder counterbores.

Following this, the hydraulic cross slide is reversed against a latch stop and the finished cylinder walls are backed away from the boring tools. The table can now be traveled away without producing undesirable tool drag lines. The block is then indexed to the next position for boring the next set of four cylinders.

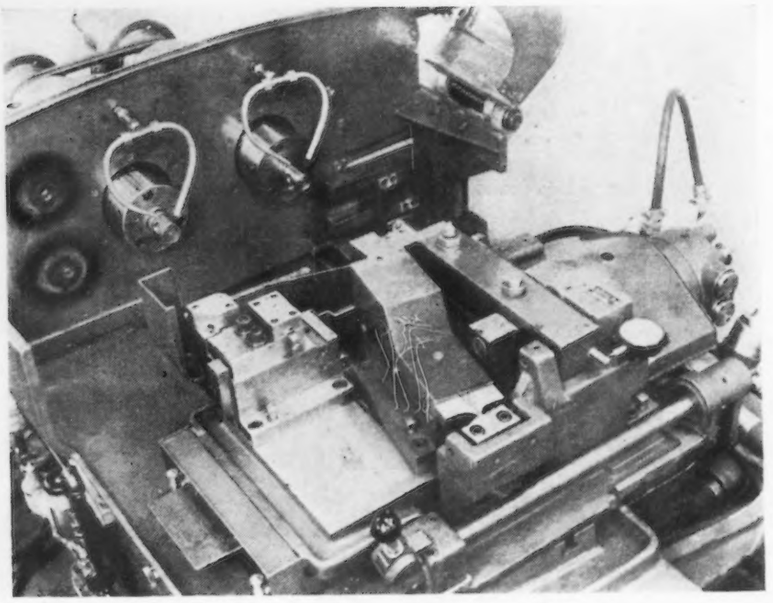
An effective arrangement for borizing refrigerator pistons is shown in fig. 10. The machine rough and finish turns, faces and grooves the part, which is made of steel. The OD is held to 1.067 to 1.068-in., overall length to 1.251 to 1.249-in., and two grooves each to 1/32-in. wide.

The roughing and finishing operations are done progressively in two stations from front to rear, each cycle producing a complete piston. The cycle is entirely automatic. The front station rough turns and faces the piston, which is rotated in a fixture attached to the spindle flange of the front boring head. The piston is located from its slotted skirt, and clamped by an air-operated pull-rod and a pin inserted through the wrist pin holes.

Two tools are mounted in a block on a hydraulic cross slide, one of which turns the piston OD in the table stroke, and the other faces the end by means of the cross slide.

Four tools in the rear station finish turn, face and groove the piston. The turning is done by a tool mounted in a pivoted dial indicator bar arranged with hydraulic tool retraction, this bar being on a bridge over the cross slide.

Grooving tools are in a block attached to the cross slide and cut the two grooves from underneath the piston in a skiving action. An auxiliary slide



LEFT

FIG. 10—Refrigerator pistons are rough faced and turned at the front station, finish faced, turned, and grooved at rear. Holding fixtures are air operated.

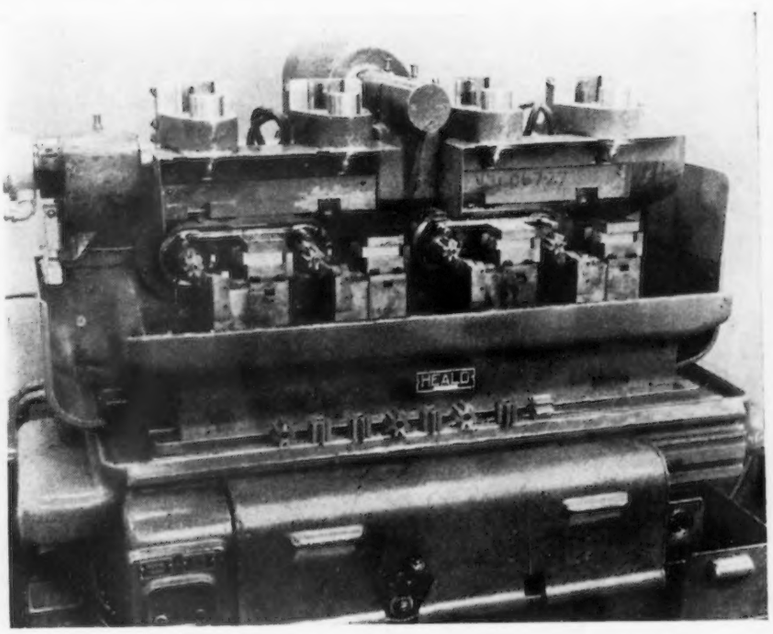
o o o

BELOW

FIG. 11—Small pinions are turned on the OD, and faced at both ends on this special setup, four pieces at a time.

mounted on the cross slide does the facing and is cam-operated to retract the tool at the end of the cut. The piston is rotated for these operations by a fixture identical with that employed in the front station.

The production of small gears such as automotive oil pump gears is illustrated in the setup shown in fig. 11. The equipment is designed to turn the OD and face both sides of gears made of steel or pressed, powdered iron. It will handle gears in sizes around 1½-in. OD and ranging in width from 1 in. to 3 in. Production plus precision are essentials in this particular job. Production is boosted above what would ordinarily be expected by using a four-station machine which finishes four gears simultaneously.



The gears are rotated by four boring heads mounted on the machine bridge. They are held by air-operated expanding stake fixtures attached to the spindle flanges, holding them from their bores. The ends of the stakes are supported during the facing and turning cuts by anti-friction centers carried by a hydraulically operated swinging arm which, also, is fastened to the machine bridge. The operation of the center arm is automatic and controlled by the table movement both for positioning and retracting. Each center element is adjustable in dovetails, thus providing quick adjustment to support stakes in the various lengths required to handle the entire range of gears. The center units also incorporate safety interlock fingers that prevent table movement unless stakes are loaded with gears of the correct length.

The OD is turned and both sides of the gears are faced simultaneously in a single table stroke. Straddle facing tools are used in each station and a skiving tool turns the entire gear breadth in a cut from below. The skiving tools are mounted in an adjustable slide while the facing tools are arranged with micrometer adjustment. End stops for positioning gears on the stakes are incorporated in the tool blocks, thus providing automatic stop retraction as the table begins its stroke.

▼ ▼ ▼

Wartime Developments

In British Machine Tools

Mental fatigue, coupled with loss of sleep occasioned by constant heavy bombing and necessary ARP work, were factors which, equally with the demand for increased production, necessitated major changes in machine tool design in Britain. In this article the author describes some of the most outstanding machines developed for mass production with the use of unskilled labor under war conditions, but which, nevertheless, are readily adaptable to normal peacetime uses.

By J. A. OATES

o o o

IN both England and America, the major part of the civilian population was engaged during the war in some form of engineering work, mainly for the supply of aircraft and arms. This produced problems which had a considerable effect on the future of machine tool design, and which, in England particularly led to advances in design which it would normally have taken at least ten years to introduce.

Although the problems confronting the American and British engineering industries were generally similar, and consisted mainly of increasing output with the aid of an ever diminishing percentage of skilled men, and a constantly increasing amount of green labor, mostly female, there were additional difficulties on the British side which still further handicapped production. For example, the constant and often heavy bombing resulted in mental exhaustion and loss of sleep, two factors which have an important bearing on the quantity and quality of output, especially where female labor is concerned. Often, of course, disruption of transport facilities added another source of irritation, as well as lack of recreation because of all-night ARP or Home Guard duties. Yet, in spite of all these troubles, coupled with others, such as shortage of materials, production rose to amazing heights, especially in the aircraft industry.

This was due, undoubtedly, to the adoption of mass-production methods on a scale never before experienced in England and applied equally to methods, machine tools, fixtures, and gaging equipment. Considerable assistance was received from America, especially in the form of special-purpose equipment, but it must not be thought that the British machine tool industry was slow to rise to the occasion. Many new and ingenious types were introduced, quickly and under battle conditions, although manufacturers were restrained to a certain degree by government orders which forced them to drop the production of some types of machines, or made them concentrate on others.

It is only natural, as the same difficulties were present in both countries, that designers in both Britain and America thought along parallel lines. The main problem was, of course, lack of skilled labor. In some British aircraft engine factories the percentage of green labor was approximately 85 pct, an alarming figure when considering the close tolerance limits observed on this type of work. This factor influenced practically all machine tool design, and resulted in simplification of design, centralizing of controls, the splitting up of operations into their simplest elements, i.e., the development of single-purpose types, and the extended use of schemes aimed to reduce operator fatigue.

It is obviously impossible to describe every machine, many of which were developed for one class of work only, and for which there will be little demand in the future. There are many, however, which can be adapted for a wide variety of uses and which will undoubtedly play an important part in peacetime reconstruction.

For example, there is the Kearns type O.C., three-spindle boring machine, fig. 1, which was specially developed for machining the 260-lb magnesium undercarriage bridge casting for the Halifax heavy bomber. Incidentally, this casting, fig. 2, measuring approximately 57 x 41 x 17 in., is claimed to be one of the largest castings made of this material under mass-production conditions. Most of the work consisted of machining and facing the very long oleo bores extending completely through each leg, and also boring and facing the cross holes at the top for the tube by which the casting is attached to the aircraft. Other minor surfaces are also machined, but the limits are not so close or so difficult to maintain.

When it became essential to increase output, it was evident that the only solution lay in the installation of a special-purpose machine capable of performing all the operations which were at that time spread over a number of standard borers. Under war conditions, the possibility of obtaining such a machine quickly was very remote.

The solution was found, however, by an important

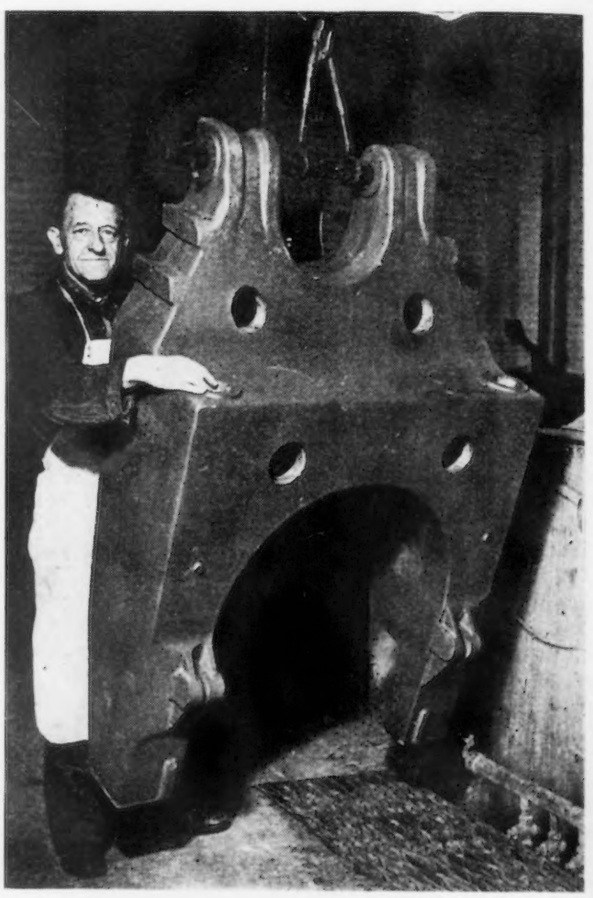
Kearns development in the designing and manufacturing of some of their horizontal boring machines in standardized units to permit the rapid and economical production of machines to suit special purposes, or any combination of such purposes, within their scope. Fundamentally, such machines are considered as assemblies of 19 basic units; bed, spindle slide, upright column, trunnion arm, boring stay, drive, table, etc. By designing each to be self-contained, and suitable for conjoining with others, there are limitless possible combinations.

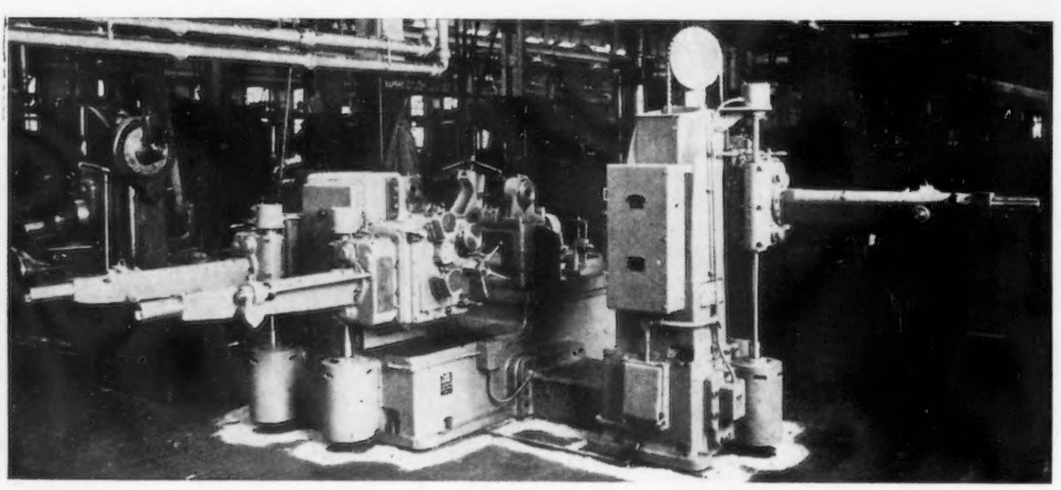
The three-spindle machine shown in fig. 1, includes three spindle slides, one standard upright, three trunnion arms (to be put in feed and drive units), and three motor drives. These units comprise the whole feed and speed mechanism, and account for some 60 pct of the entire machine; the remainder, including the bed and the central upright between the twin horizontal heads, was specially made. In due course, this machine will be released from its present specialized job, and can then be extended or rearranged, or even made into more than one machine to suit fresh requirements.

Before setting up on the machine, each casting is marked off with a center line to prevent machining difficulties arising from minor variations, since castings are received from different vendors. The casting is then placed in the fixture on the machine bed, and set up in respect to the marking off. The distances between the ends of the casting legs and the adjacent fixture bearings for the two longitudinal boring bars are gaged to insure cleaning up during the subsequent facing operation, and the fixture clamps are tightened.

The three boring bars for the first operation of rough boring are then inserted. Each of the two bores for the undercarriage legs is machined to three diameters, i.e., 5⅛ in., 5¼ in., and 5⅜ in., at a speed of 285 rpm and a feed of 0.010 in. Carbide-tipped tools are used for all operations and cutting is done dry. The bearings supporting the boring bars, however, are flooded with oil under pressure from a mechanical pump to exclude magnesium swarf, which would be extremely destructive if it entered the bearings.

The second operation consists of machining eight end faces, with cutters inserted in slots in the boring bars. First, the bottom and top faces for the leg bores are flat faced, the depth being checked by length gages inserted between the casting and the inside surfaces of the four bearings on the machine bed, which are accurately ground for this purpose. The cutter speed is 108 rpm and, because of the concurrent gaging process, hand feed is employed. The next stage is to shape the two top faces with form cutters in place of the flat cutters used earlier. Simultaneously with the above operations, four end faces for the top attachment bore are machined in two stages, i.e., roughing and finishing, at a speed of 89 rpm. Gaging of all these faces is from the inner surface of the bearing for the transverse boring bar, which is the nearer to the driving end. After completing the facing operation, the third and final operation, comprising finish





ABOVE

FIG. 2 — Magnesium undercarriage bridge casting prior to machining. This is said to be the largest casting of this material produced in quantity.

o o o

LEFT

FIG. 1 — Special purpose Kearns triple-head boring machine developed for machining magnesium undercarriages for Halifax bombers, and made up essentially of standard units.

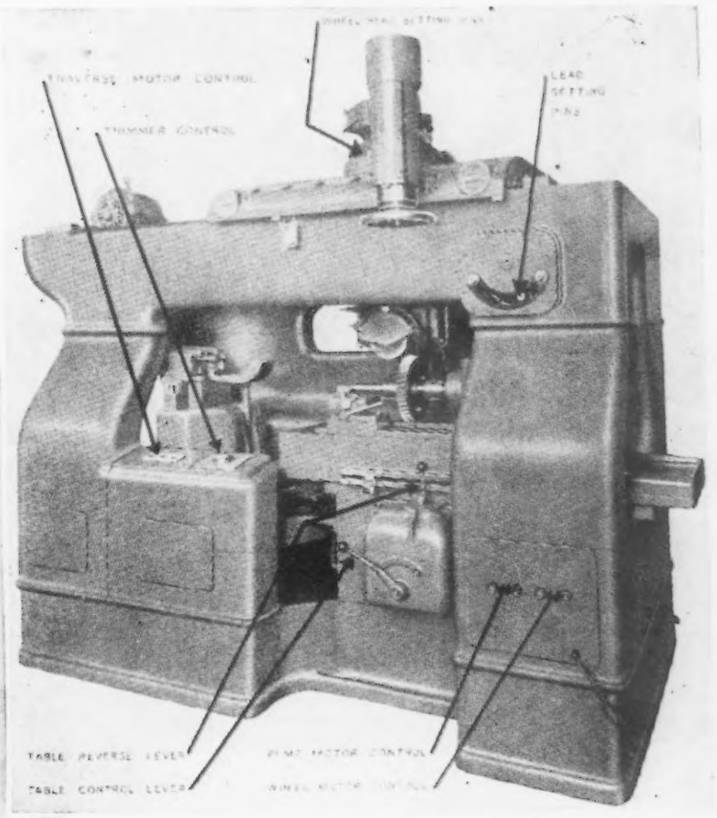
RIGHT

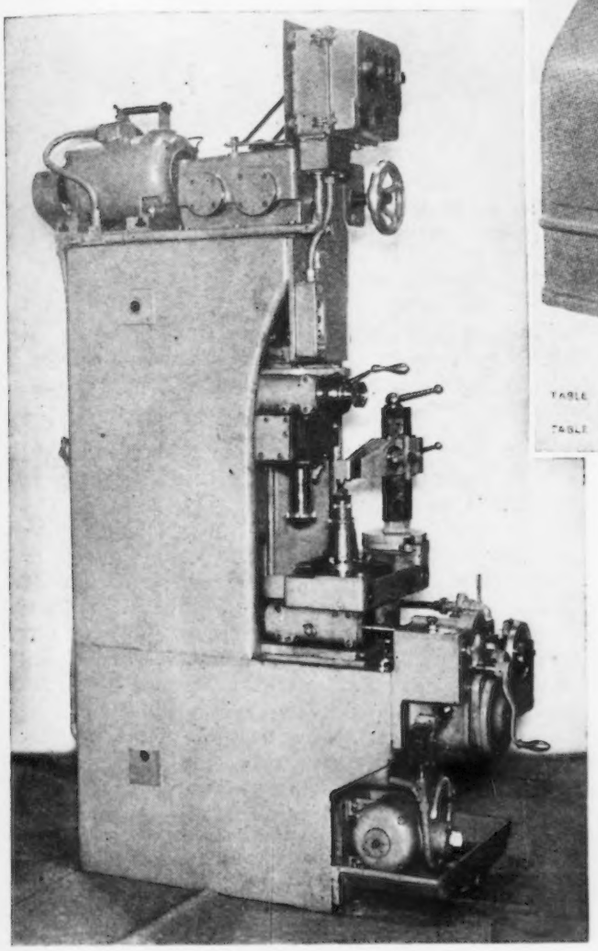
FIG. 4—Front view of the Orcutt helical gear grinder said to grind a true helix within 0.0001 in. in 6 in., and to index within 0.0001 in. on a 12-in. diam.

o o o

BELOW

FIG. 3—The Sykes V 10 gear-cutting machine on which limits of accuracy as close as 0.0001 in. are claimed. Its extremely narrow width of 22 in. allows it to be assembled into batteries for mass production.





boring of all three bores simultaneously, is performed.

The whole of the above work is carried out by four trainee operators, specially trained as a team, who complete the boring and facing of an undercarriage casting in 40 min, this including loading and unloading. By the methods formerly employed one casting was machined in 6 hr by one operator and one laborer. Thus the manhours per piece are now three, against a figure of about nine if the expense of a laborer is regarded as being one half that of an operator.

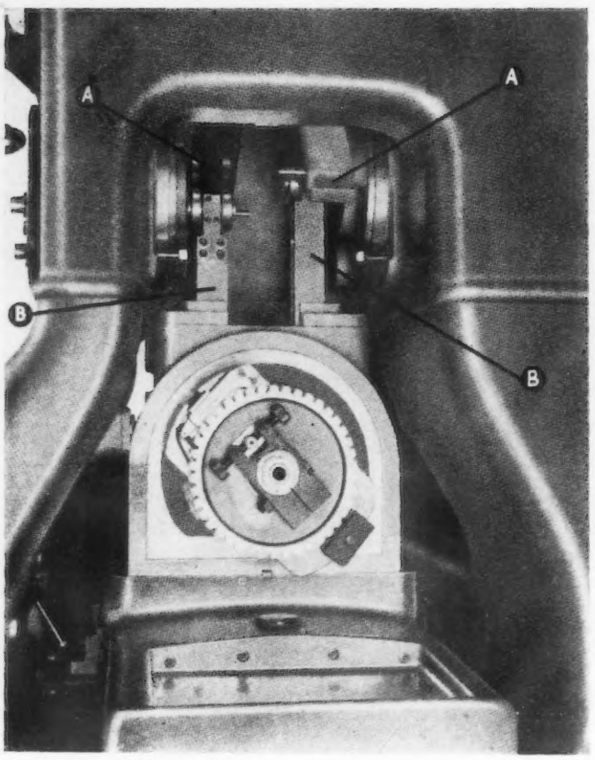
An appreciable proportion of the saved time results from the application of electric plugging control to each of the three motor drive units. This is a form of electric braking which brings the motors and, therefore, the spindle, rapidly to a standstill. As one cycle involves a minimum total of 16 to 20 stops, the overall time economy is considerable.

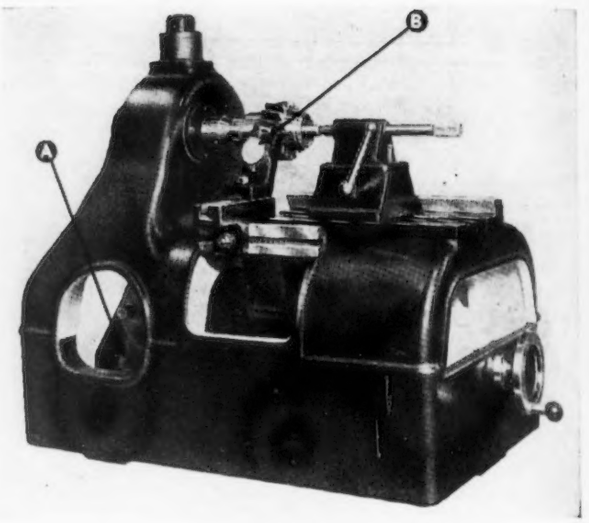
The outstanding success of this installation emphasizes the importance of cooperation by the user of the machine tool with the maker. It also points the way to considerably wider application of horizontal boring methods. The standard type of horizontal borer will continue to be as essential as ever where work of the universal type, such as boring, milling, drilling and tapping, is to be done, but machine tools constructed of standard units make it economical to equip factories with single or multipurpose borers exactly suited to specialized processes where production demands it. When production ceases, the machines are easily rearranged, converted or extended, to cater for new jobs.

Gear Generator

The urgent need for a vastly increased output of gears, particularly of a high-class nature suitable for the aircraft industry, led to the development of several interesting machines. For example, there is the Sykes V 10 vertical gear generator, fig. 3, a mass-production machine which will handle external gears up to 14-in. diam by 2¼-in. face. It has been designed specially for aircraft work, and can be used for cutting straight and helical teeth in both external and internal gears. Regular and irregular contours, such as pipe flanges and clutches, usually machined by milling or slotting, can also be handled. Although operating on the well-known gear-shaper principle, the general design is entirely new and incorporates several important features. Limits of accuracy as close as 0.0001 in. are claimed.

The cutter is carried on a vertical reciprocating spindle and rotates at a predetermined speed. The work, which is mounted on a table beneath the cutter, rotates at the correct speed and also feeds in at the





ABOVE

FIG. 6—Orcutt lead or helix measuring machine designed to give consistent readings in tenths of thousandths of an inch.

o o o

LEFT

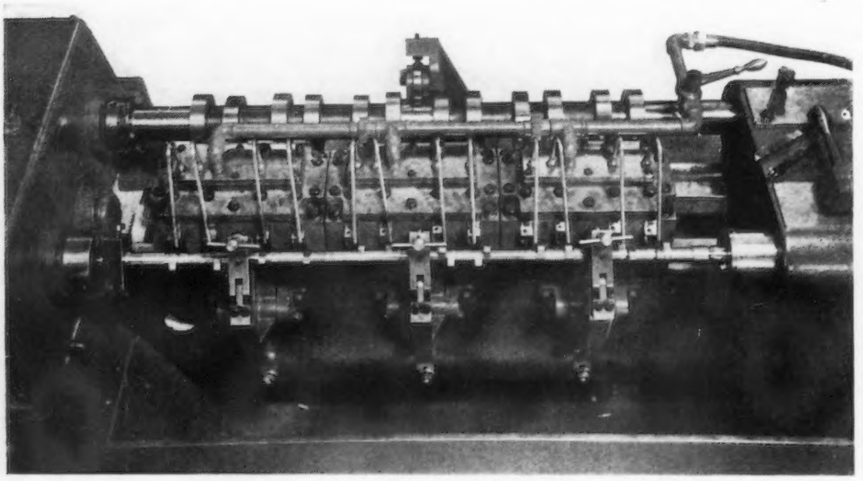
FIG. 5—Closeup of the indexing and helix generating mechanism of the Orcutt gear grinder.

completion of each complete revolution. This is, of course, the recognized principle of gear shaping, whereby the cutter and work rotate in unison, in a similar manner to two meshing gears. The major part of the mechanism, including all the change wheels, is housed in the main column and is accessible from the rear of the machine. A forced lubrication system is provided for supplying oil to all moving parts of the cutter mechanism. It also sprays oil on all gears, including the change wheels.

A wide range of cutting speeds is available to suit materials as different as alloy steels and aluminum. Changes are obtained by means of interchangeable V-belt pulleys, a two-speed motor, and reduction gear mechanism. The speed of rotation is controlled from change gears, but it is rarely necessary to alter this, as one standard feed is usually sufficient for all classes of work. Change gears also control the number of teeth in the work. The gear ratio is the same as the ratio between the number of teeth in the cutter and the number of teeth in the work.

The cutter relieving mechanism is similar to that used already on the Sykes double-cutter spindle machines and is operated by a hardened low-angle wedge. No matter how heavy the pressure against it on the downward stroke, the cutter cannot be forced away from the work. This insures the necessary rigidity and accuracy for machining tough alloy steels. The simplicity of design provides for durability.

Another point of interest is the automatic in-feed mechanism situated in the operating position at the front of the machine. It is an improved version of the design already employed on other Sykes machines. Provision is made for feeding the work towards the cutter in any desired number of movements of equal or varying amounts. For example, the first, or rough-



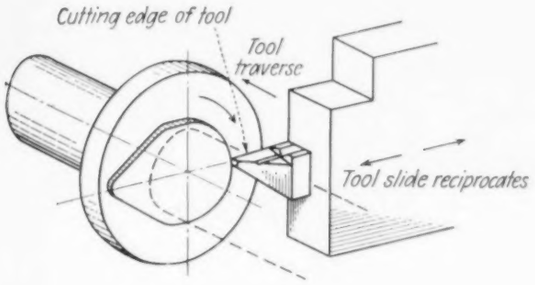
o o o

FIG. 7—Top view of the Scrivener profile turning lathe set up for machining a camshaft. The master camshaft and steady roller are at the rear.

o o o

ing cut may be heavy, each successive feed giving a lighter cut. These variations are obtained by simple radial adjustment of actuating rollers mounted on a rotating disc. This mechanism also withdraws the work from the cutter and automatically stops the machine on completion of the cycle. The work-table has a diameter of 10 in., and is provided with six T-slots for securing work-holding fixtures. Shafts up to 2-in. diam and 20-in. long can be accommodated by the hole in the center. A steady arm is available to support shafts or slender components: this bolts at the side of the table and can be adjusted by rack and pinion movement.

Although handwheels are graduated to read in thousandths of an inch, it is obviously impossible to obtain readings of 0.0001 in. from them. To overcome this difficulty a dial indicator can be fixed to one or both sides of the table to work against adjustable stops. In-feed readings can be then made to limits of 0.0001 in., and, if two dials are used, a constant check is provided on the squareness of the table movement.



ABOVE
FIG. 8 — Diagram illustrating the principle of operation of the Scrivener lathe.

o o o

RIGHT
FIG. 9—Cross-section through one of the tool blocks of the Scrivener lathe.

Control is from a three-button switch within easy reach from the operating position. One button operates the fast motor speed and another the slow speed, a feature which is very useful for setting-up purposes. The machine occupies very little floor space and has a width of only 22½ in.

Change over from cutting one type of teeth to another can be effected in a few minutes by removing the cutter spindle and guide and substituting another, which is held in place by six screws. A wide variety of internal and external special shapes can be cut by using form cutters in place of the normal gear tooth shapes.

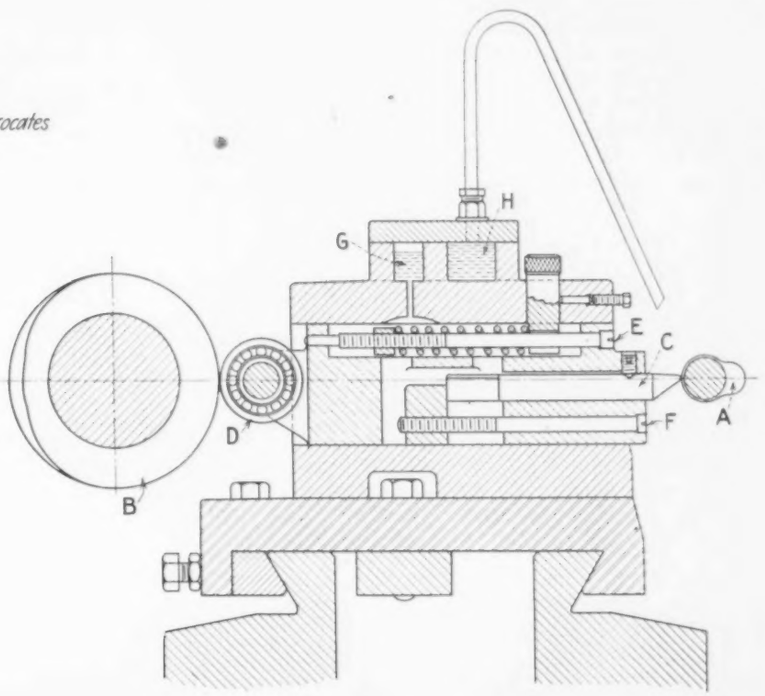
Although this machine is primarily intended for production work, its simplicity in design and operation allows it to be used quite successfully for jobbing work and short runs.

The main drive is from a 1½-hp two-speed motor mounted at the top of the machine. A second motor drives a coolant pump which has an output of 5 gpm. The stroke is adjustable between 0 and 2½ in.

Helical Gear Grinder

One addition in the gear grinding group of machines is the Orcutt model H. K. machine for grinding the teeth of helical gears, fig. 4. Prior to its design, the manufacturers made a careful study and many practical tests of the two methods of grinding helical gear teeth, i.e., the generating system and the formed wheel method. It was found that the greatest drawback to the latter was the change in shape of the profile due to interference of the grinding wheel in generating the helix. The larger the wheel and the greater the helix angle, the greater the interference.

This results in more being cut away from the tip and the base of the tooth, and prevents the use of standard formers. However, as the design of the existing spur grinders built by the firm did not employ standard formers, this was not a serious obstacle. Actually, they can use any former for shaping the grinding wheel, provided the desired result is obtained on the gear tooth. As a result of the investigations, it was decided that the advantages of the form wheel greatly exceeded those of the generator type, and so that principle was adopted for the machine. References above to generating are meant to apply only to the involute, as the helix must, of course, be generated on all types of grinders.



The makers claim that the machine will grind a true helix to within limits of ±0.0001 in. in 6 in. of axial length, and that any desired tooth shape is obtainable to within ±0.0001 in. Accuracy of indexing is said to be within ±0.0001 in. on a 12-in. diam. An excep-

tionally high rate of production, combined with fine surface finish, is also claimed.

It was decided that the most important element in a helical gear was the generation of a true helix, and this requirement governed the design. For instance, rigidity and balance were necessary, and the design was allowed to come as it would, with the result that the total weight of the machine is over 9 tons, to grind 12-in. diam gears. From the end view, fig. 5, it will be seen how the helix generation is achieved. The two inclinable straightedges (a) are set to equal and opposite angles within very close limits, and the two followers (b) are strained against each other through tapes, so that there is no play between the contact rollers of either arm and the straightedges. The positive stroke is always with the pressure downwards. On machines with one arm only, a uniform helix is not obtainable. It should be mentioned that a helix or lead measuring device was specially developed to check the helix generating mechanism, see fig. 6. With regard to wheel truing, it was decided to employ the standard pantographs which the firm used on their spur grinders.

Fig. 6 illustrates the patented Orcutt lead or helix measuring machine developed for giving consistent readings in tenths of thousandths of an inch. In principle, it is the same as the helix generating mechanism on the grinder. If readings are taken always in one direction, consistent results are obtained and backlash between the rack and pinion does not matter. Setting of the lead generation is made by means of a comparator, which itself is set by gage blocks. Any helix can be checked up to 45° either hand, and face width of 4 in. can be checked on gears of 13-in. diam.

The carriage A carries inclinable straightedges which are rotatable and can be set from 0° to 45° either R.H. or L.H. Held between them are four roller bearings with such adjustments as to give no backlash. These bearings are rigidly held in the vertical rack bar, the ground rack on the bar being in mesh with a ground pinion on the work spindle. If the carriage is moved along its ways, the vertical bar will either be raised or lowered, imparting rotary movement to the work spindle. An indicator B is attached to the carriage, and as this moves along it should remain at a zero setting when the stylus is in contact with the tooth face and the lead on the tooth is correct.

Profile Turning

Another problem associated with the production of aero, automobile and tank engines was the rapid and accurate production of camshafts. If these are to be machined on a lathe, which provides one of the simple and economical solutions, the problem can be approached in two ways. In the first place, a special machine can be employed, using a normal turning tool cutting on the periphery of the cam, the movement of the tool to and from the work, which is necessary to give the required contour, being imparted by a master cam. This method of machining, however, also necessitates the interposition of suitable mechanism for rocking the tool-holder, so as to ensure that in spite of the varying contour of the cam the tool is always presented to the work at the correct cutting angle throughout each revolution of the work.

The second method is to approach the problem from another angle by employing a knife tool which, while traversing axially along the shaft, finishes the cam by means of a shaving cut, as shown by the diagram fig. 8. This is the principle of copy generating embodied in the Scrivener profile-turning lathe, fig. 7, which has been adopted by many of the leading makers of aero and automobile engines.

The method by which the tool is advanced and withdrawn from the work so as to give the correct contour can be followed by reference to fig. 9. It will be seen that a master cam (B) operates on the toolholder through a ball-bearing roller follower (D), the tool (C) being maintained in close contact with the roller by the action of the powerful coiled spring (E). The em-

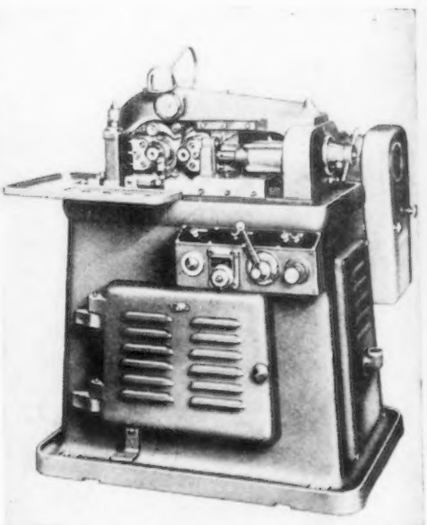
RIGHT

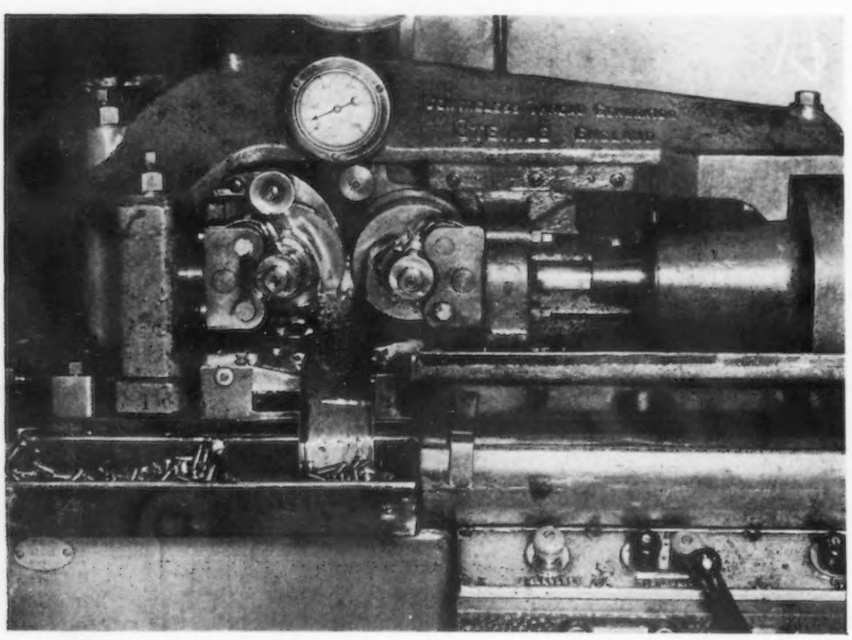
FIG. 10—General view of the Steinle centerless thread generator on which threads may be rolled to an accuracy of 0.0002 in. per 3-in. length.

o o o

BELOW

FIG. 11—Close up view of the head of the Steinle machine showing the arrangement of the dies and the hydraulically operated slide.





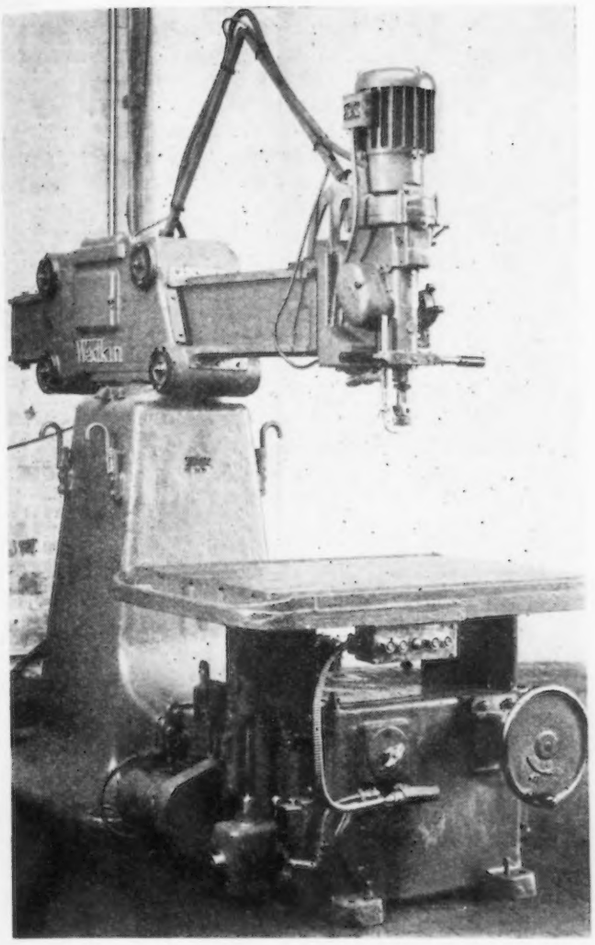


FIG. 12—Special tapping machine constructed by applying a standard Huller head to the radial arm of a Wadkin routing machine.

ployment of the special knife tool obviates any need for rocking the toolbox to maintain the correct cutting angle, as would be necessary with a normal turning tool. The radius of the tool point and the radius of the roller follower have a definite relationship to each other, so that the form traced out by the point of the tool will be the one for which the master cam is designed. It is therefore fundamental for the production of accurate work by this method that the correct radius be maintained at the tip of the tool, and that the center line of this radius is always at the proper height from the base of the tool.

Using this method of production it is possible to machine an automobile camshaft for a four or six-cylinder engine in a maximum floor-to-floor time of 3½ min. It will be obvious that this machine can be readily adapted for a variety of die sinking, copy turning, and irregularly shaped work.

Thread Production

One of the most noticeable features during the war was, as far as machining is concerned, the raising of standards of accuracy under mass-production conditions to levels equivalent to former toolroom practice. This applied particularly to screw threads which, possibly, had been rather neglected in the past. Threaded parts were required in vast quantities and to very fine limits, and very little skilled labor was available.

One of the most effective solutions to this problem was supplied by the introduction of the Steinle centerless thread generator, fig. 10 designed for producing accurate screw threads by the rolling process. It will handle threads up to 2¼ in. long by 9 threads per inch, and will accommodate work up to 2-in. diam when fitted with a special work rest. In one British aircraft engine factory this machine is threading 5/16 B.S.F. studs at the rate of 40 per min, the accuracy being held to 0.0002 in. per 3-in. length. The dies, made from Neor steel, are giving a life of 80,000 studs between grinds. This machine, as well as that described later, is now marketed in the U. S. A. by the Steinle Machine Co.

On this machine, the work is carried on a rest similar to that used on the centerless grinding machine, the work being positioned with its center line below the centers of two forming rolls, the distance varying according to the nature of the job. One of the rolls revolves about a stationary axis, while the other, which is carried by a hydraulically operated slide, is fed inwards to engage the work and apply the pressure necessary for the threading operation. As soon as the thread has been formed to full depth, the moving roll returns to its starting point again, allowing the threaded workpiece to be removed. There is no lateral movement of the work during the working portion of the cycle of movements, the blank merely revolving in contact with the threaded rolls.

For the production of a right-hand thread, both rolls are threaded left hand. The circular dies, or threading rolls, may be compared with thread rolling dies of the flat type, on which the ridges represent a development of the screw thread and are inclined in the same direction when viewed from the rolling face, the angle corresponding to the helix angle of the thread being rolled.

The rolls are multi-start, and for threading accuracy are developed in a ratio of the blank diameter of the piece, which, broadly speaking, is the effective diameter of the finished screwed part. As a simple example, should the effective diameter be ½ in., the rolls could be 4-in. diam with eight starts, since ½ in. is ⅛ of 4. The roll sizes are determined to suit the characteristics of the proposed job.

An electrical sizing device, working in conjunction with the stretch of a stop bar, controls the finished size of the work. This combination gives very accurate and consistent results, and allows the work size to be controlled within the closest aircraft tolerances.

For tapping purposes, there is the well known Huller machine, which was introduced several years ago. During the war, the range of usefulness of this machine was considerably extended by fitting the tapping head to the Wadkin L.Y. radial arm routing machine in place of the normal head fig. 12. In some cases, a drilling head was attached to the opposite end of the arm to enable both drilling and tapping to be carried out at the same setting. This arrangement was particularly useful for large sheet work, such as encountered in the aircraft industry.

The machine illustrated has a maximum tapping radius of 5 ft 6 in. and can be used for holes up to ½-in. diam in steel or ⅝-in. diam in brass. The finest pitch which can be cut is 60 threads per inch, and speeds from 100 to 1120 rpm are obtainable. A feature of this model is a power-operated table with a maximum vertical movement of 22½ in.; the maximum automatic vertical feed of the tapping head is 3 in.

Heat Treatment Of High-Speed Steel

By MORRIS COHEN and PAUL GORDON
Department of Metallurgy, Massachusetts Institute of Technology

In the first two sections of this five-part article, the authors summarized the mechanism and effects of isothermal cooling, and explored the fundamental role of tempering. This third section is devoted to the relationship of time and temperature to maximum secondary hardness and to the kinetics of the tempering process. The complexities of the hardening treatment with respect to retained austenite are also considered.

TIME-TEMPERATURE Relations for Maximum Secondary Hardness and Complete Transformation During Tempering—The specific times of ½ hr of tempering for maximum secondary hardness and 2½ hr of tempering for complete transformation of the retained austenite in 18-4-1 quite clearly hold only for a tempering temperature of 1050°F. Changing the tempering temperature varies the rates at which the tempering phenomena described above take place. The manner in which these rates depend upon the tempering temperature is illustrated in the curves of fig. 20. These curves trace the tempering reactions for 18-4-1 steel at temperatures of 950°, 1000°, 1050°, 1100°, and 1125°F. The upper family of curves shows the changes in room-temperature hardness occuring during tempering at the several temperatures; the lower family shows the changes in specific volume. It may be seen that whereas at 1050°F the hardness peak is reached after ½ hr of tempering, at 950°F 10 hr are required, while at 1125°F the maximum hardness is attained after as little as 2 to 3 min of tempering. Similarly, complete transformation (represented by the leveling off of the specific volume curves) which is accomplished after 2½ hr at 1050°F takes 100 hr at 950°F and only 15 min at 1125°F.

The usefulness of data such as those just discussed for 18-4-1 steel can be greatly enhanced by plotting them in a more convenient fashion than

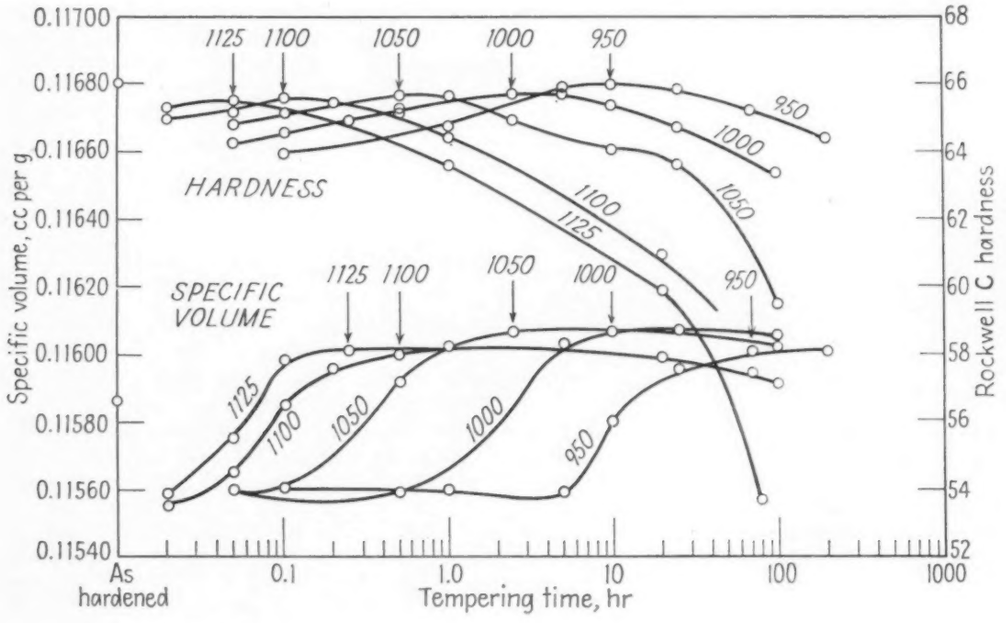


FIG. 20 — Room temperature hardness and specific volume of 18-4-1 high-speed steel as a function of tempering time and temperature after quenching from 2350° F.

the somewhat cumbersome curves in fig. 20. One method of doing this is shown in fig. 21 in which the times for maximum secondary hardness and for complete transformation are plotted on a linear scale against tempering temperature. The shapes of the resulting curves, however, are such that accurate extrapolation of the curves to temperatures either higher or lower than those for which actual experimental data are available is difficult, if not impossible. This difficulty may be circumvented by resorting to the type of plot pictured in fig. 22. Here the expedient of using a logarithmic, rather than a linear, time scale may be seen to result in straight-line relationships between the tempering temperature and the logarithm of the time necessary to reach maximum secondary hardness or complete transformation.

The time-temperature relations during tempering of several of the chief grades of high-speed steel have been evaluated. Straight-line plots of the tempering times (on a logarithmic scale) to maximum secondary hardness and to complete transformation against tempering temperature are shown for these steels in figs. 22 to 25.

Kinetics of the Tempering Process—Room temperature measurements of such properties of high-speed steel as its specific volume and hardness, although they will reveal what has taken place during the tempering cycle, do not indicate whether the various phenomena occur during heating to, holding at, or cooling from, the tempering temperature. Thus a study of the kinetics of the tempering process must be based upon measurements made while the changes are actually taking place. This may be done by utilizing a dilatometer to record the changes in the length of a rod specimen during the various tempering reactions.

A typical dilation curve is shown in fig. 26 for the tempering of 18-4-1 steel at 1050°F for 2½ hr. During heating, the curve first reveals only the normal thermal expansion resulting from the rising temperature, but at about 200°F an appreciable decrease in the slope of the curve becomes noticeable. Here the tempering of the primary tetragonal martensite formed during hardening has begun with its concomitant decrease in volume. At 500°F this

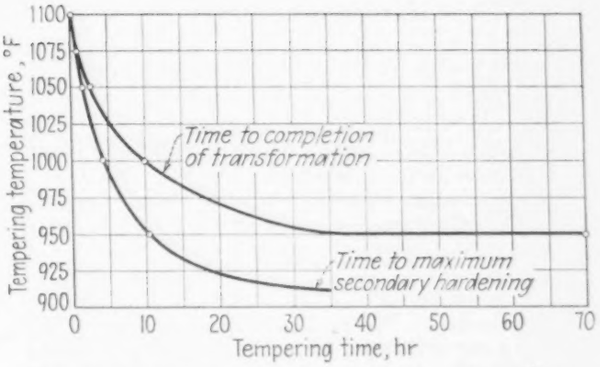


FIG. 21—Time-temperature relationships for completion of austenite transformation and maximum secondary hardness during tempering of 18-4-1 high-speed steel after quenching from 2350° F (linear time scale).

tempering is essentially complete and the dilation curve once again shows only the uniform rise due to thermal expansion. During the 2½-hr heating period at 1050°F a very small amount of isothermal expansion occurs as a result of the decomposition of a relatively minor part of the residual austenite, (at somewhat lower tempering temperatures, for example at 1000°F, this isothermal expansion does not appear). As the steel is cooled from 1050°F, the dilation curve shows uniform contraction closely paralleling the course of the previous heating curve until a temperature of about 475°F is reached. At this point an expansion is superimposed on the cooling curve; it is here, **during cooling** that the bulk of the retained austenite starts to transform.

The effect of tempering time on the austenite transformation is illustrated in fig. 27 which shows a series of dilation cooling curves (the heating curve A) as predicted by fig. 15. After 1 hr of tem-

figure) for 18-4-1 high-speed steel after tempering for 5 min, for 1 hr, for 2½-hr and for 12 hr at 1050°F. **Tempering for 5 min at 1050°F causes no** austenite transformation during subsequent cooling (fig. 27, curve A) as predicted by fig. 15. After 1 hr of tempering, considerable transformation does take place during the cooling (fig. 27, curve B) while 2½-hr of tempering is sufficient to cause all the retained

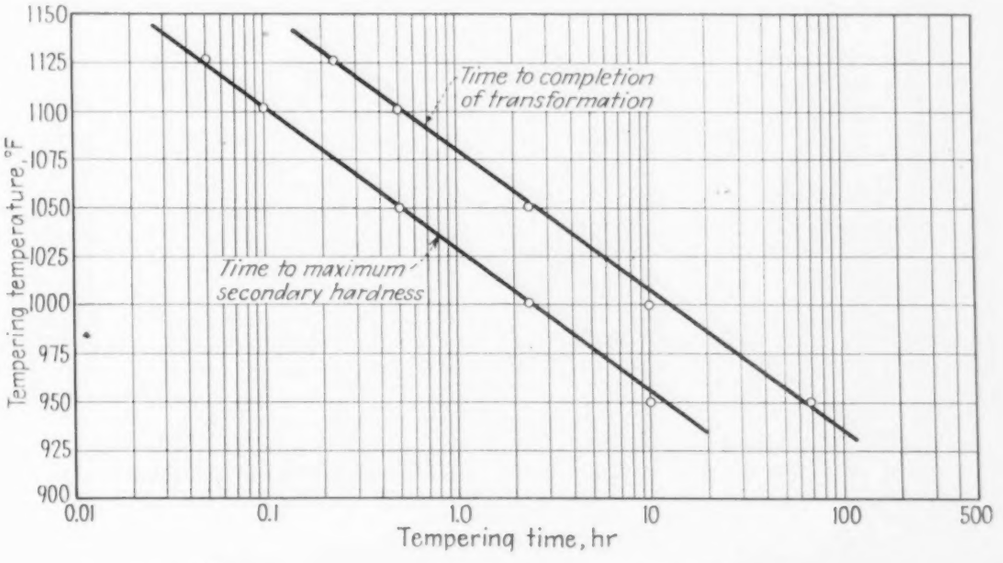


FIG. 22—Time-temperature relationships for completion of austenite transformation and maximum secondary hardness during tempering of 18-4-1, 18-4-2, Mo-W (1½-8½-4-1), and W-Mo (6-5-4-1¾) high-speed steels. Hardening temperatures used: 18-4-1 and 18-4-2 = 2350° F; Mo-W = 2200° F; W-Mo = 2225° F. (Gilletal)[1], (Gordon)[35] (and Bluhm).[36]

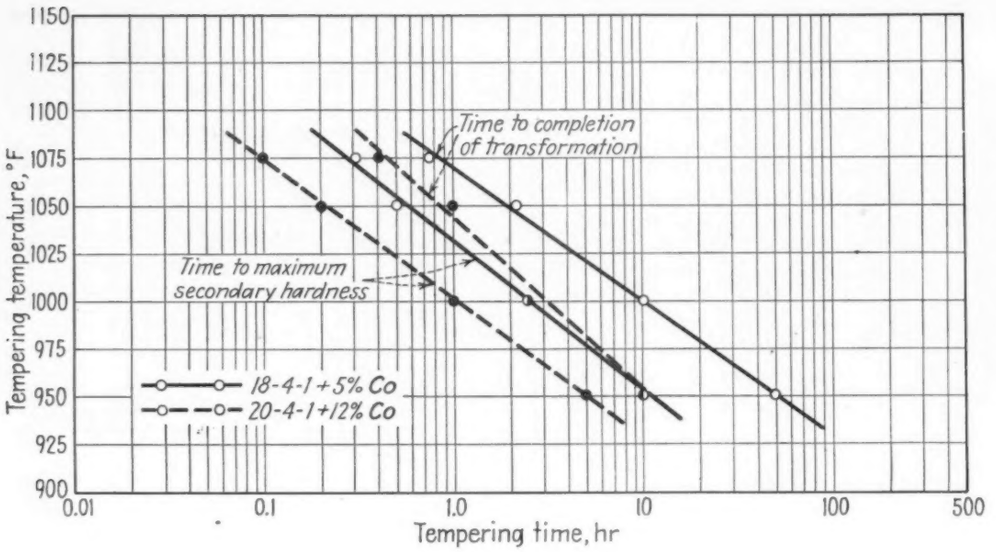


FIG. 23—Time-temperature relationships for completion of austenite transformation and maximum secondary hardness during tempering of 18-4-1 + 5 pct cobalt and 20-4-1 + 12 pct cobalt high-speed steels. Hardening temperatures used: 18-4-1+5 pct Co= 2400° F; 20-4-1+12 pct Co = 2375° F. (Bishop).[17]

austenite to transform as indicated by the coincidence at room temperature of curve C, 2½ hr, and curve D, 12 hr at 1050°F. In addition to increasing the quantity of austenite transformed, longer tempering times raise the temperature at which the austenite decomposition begins.

The rate of cooling and the number of cycles, that is the number of separate heatings and coolings, involved in the tempering process have no appreciable effect on the quantity of austenite which will transform. However, these two factors have an important bearing on the ultimate practical worth of a tempered tool. Because the great majority of the austenite transforms during cooling, the temperature gradient between the outside and inside of the tool, just as in the case of hardening, leads to the setting up of high stresses. Faster cooling rates not only accentuate this temperature differential, but also allow the steel less opportunity to adjust itself to the volume changes taking place. Hence the danger of cracking is increased. Furthermore, the martensite formed from the retained austenite is untempered, since it formed during the cooling from the tempering temperature and was thus not subjected to the treatment at 1050°F. It is obvious, therefore, that 18-4-1 tools tempered for 2½ hr at 1050°F **in one cycle** do not possess the optimum combination of physical properties.

If, however, the tempering is carried out in two or more properly chosen treatments the tools may be considerably improved. For example, if two tempering cycles are used each consisting of 2½ hr at 1050°F, it will be seen that during the first cycle the martensite formed in the hardening operation is tempered, the internal stresses resulting from that martensite formation are relieved, and the retained austenite is virtually completely transformed into martensite in cooling from the tempering treatment. The second tempering cycle, then, serves to temper the martensite formed during the first cooling cycle and to relieve the stresses set up by that transformation. The improvement in physical properties of such double tempering over single tempering is quite apparent in a comparison of the figures for

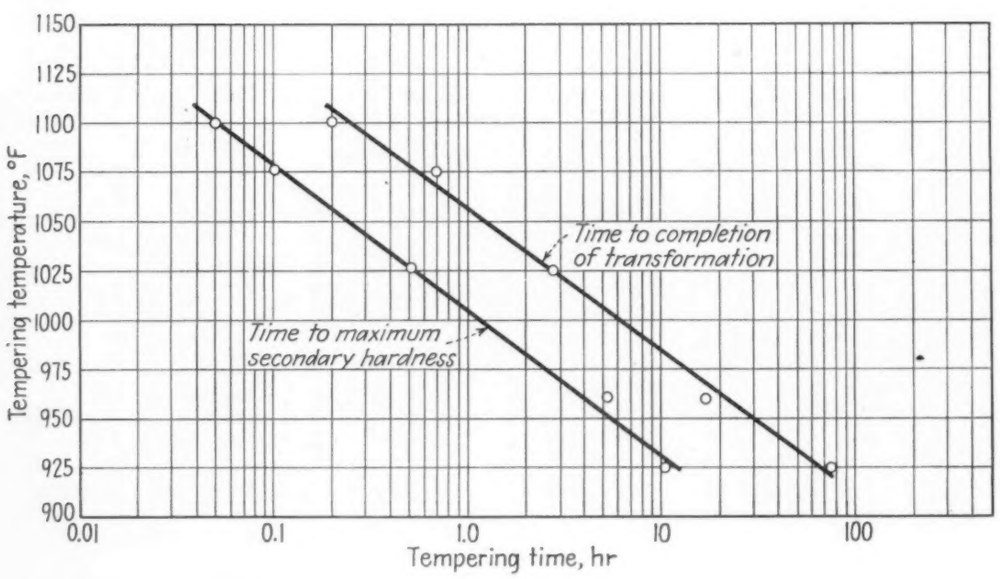


FIG. 24—Time-temperature relationships for completion of austenite transformation and maximum secondary hardness during tempering of Mo-V (8¼-4-2) high-speed steel. Hardening temperature= 2225° F. (Gordon).[15]

treatments 3 and 6 in table IV. It is seen that the transverse strength and the resistance to torsion impact are considerably increased by double tempering. The accompanying drop in room-temperature

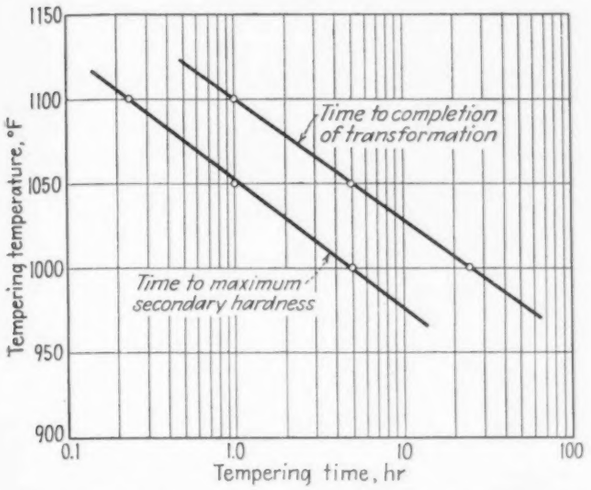


FIG. 25—Time-temperature relationships for completion of austenite transformation and maximum secondary hardness during tempering of high carbon-high vanadium (5¾-4¾-4¼-4 + 1.25 C) high-speed steel. Hardening temperatures—2225° F (Lement).[18]

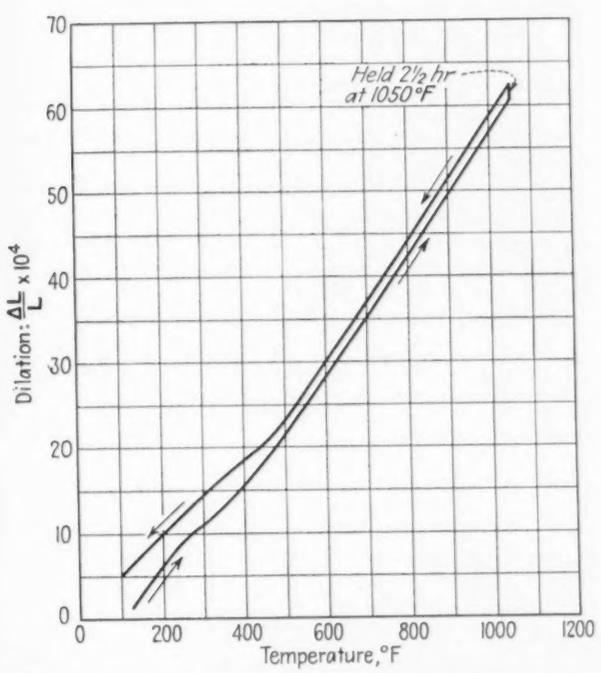


FIG. 26—Dilation-temperature curve for 18-4-1 high-speed steel during tempering after quenching from 2350° F (Koh and Cohen).[11]

hardness and in hot-hardness is, for most tools, not serious. As a matter of fact, the second temper may be carried out at 900 to 1000°F without any sacrifice in hardness.

Tempering After Arrested Hardening

Effect of Quenching Bath Temperature Followed by Normal Tempering— The foregoing discussion of the tempering of high-speed steels was predicated on the basis that the tools had been hardened by cooling all the way to room temperature. Now, in the commercial heat treatment of high-speed steel it frequently happens that in the hardening operation the tools are not allowed to reach room temperature before being transferred to the tempering furnace. This procedure may be adopted in the case of complicated tools which are particularly susceptible to distortion and cracking, and is accomplished by arresting the quench from the high heat temperature, whether the cooling be conducted in air, in oil, or in molten salt followed by air. It is also likely that many hardened tools fail to attain room temperature because of inadvertent reasons. Quenching oils often become heated due to constant usage, and if the tempering is carried out directly after quenching into such oil, the minimum temperature between austenitizing and tempering may become relatively high.

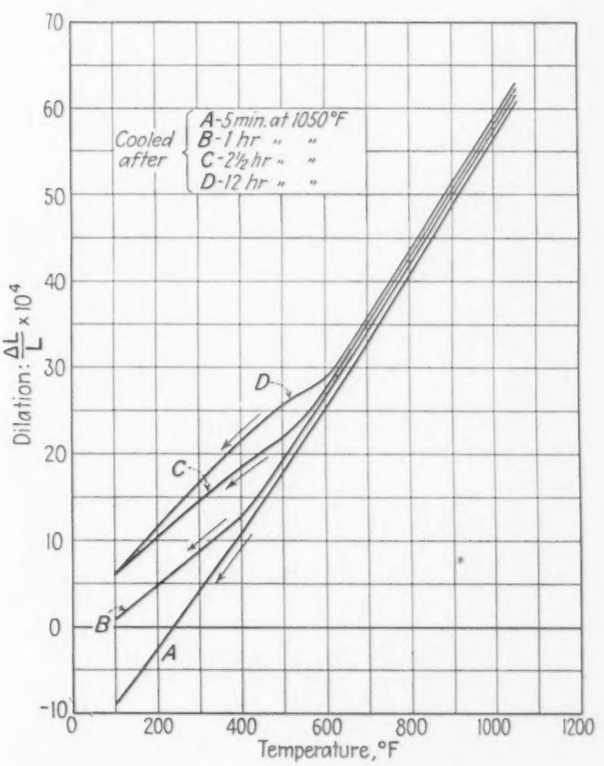


FIG. 27—Dilation curves for 18-4-1 high-speed steel showing effect of tempering time at 1050° F on subsequent transformation of the austenite during cooling. Hardening temperature = 2350° F (Koh and Cohen).[11]

It has been demonstrated that, in the hardening of high-speed steel, the austenite-martensite transformation takes place characteristically on cooling below the M-point, and thus the austenite-martensite ratio that goes into the tempering process depends upon the temperature to which the steel is cooled in the hardening operation. It becomes of practical importance to know whether the mechanism of tempering is affected by the presence of unusual amounts of austenite resulting from restricted cooling through the martensite range. As a matter of fact, it is probable that the lack of information concerning this tempering problem is responsible for unnecessarily inferior properties in those instances

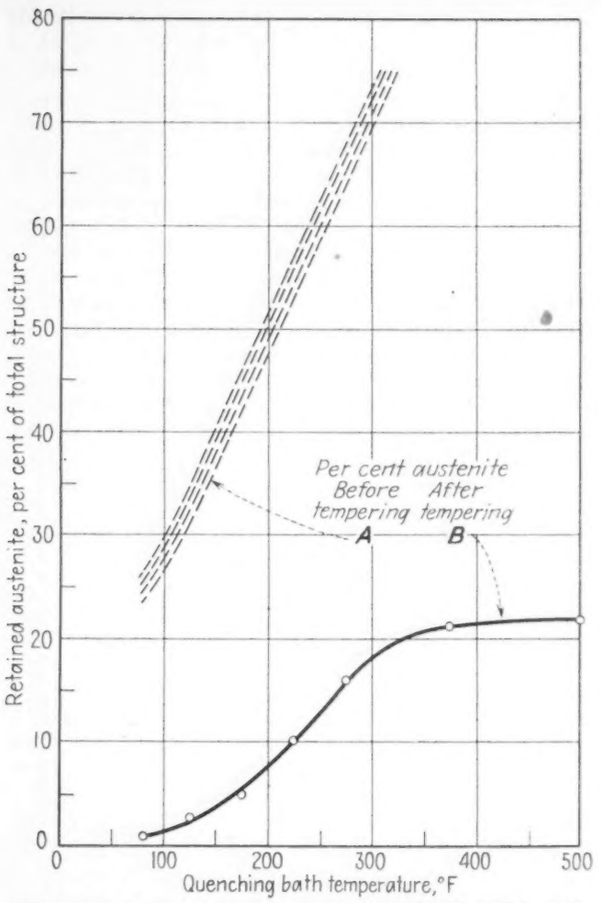


FIG. 28—Percent austenite in W-Mo (5¾-4½-4-1¼) steel after quenching from 2225° F to indicated temperatures and single tempering directly for 2½ hr at 1050° F. (Gordon, Cohen and Rose).[19]

where the austenitized tools are not cooled "all the way."

After normal hardening of the tungsten-molybdenum high-speed steel*, that is, where the cooling has been carried to room temperature, a single 2½ hr tempering treatment at 1050°F is sufficient to cause virtually all the retained austenite to convert to martensite during the subsequent cooling. Fig. 28 illustrates the effect of arrested quenching on the amount of austenite remaining in the steel at room temperature after a similar tempering treatment. Here the samples of steel were quenched from the austenitizing temperature into a liquid bath held at various temperatures in the range 80° to 500°F, transferred directly into the tempering furnace where they were heated at 1050° F for 2½ hr and then cooled to room temperature.

The percent of austenite present in the steel after such treatments is plotted in fig. 28, curve B, as a function of the quenching bath temperature. For the sake of easy comparison the amounts of austenite existing in the steel at the quenching bath temperature before tempering are also shown in fig. 28, curve A. According to fig. 28 the 2½-hr tempering treatment at 1050°F reduces the retained austenite content to about 1 pct if the austenitized steel is first cooled to room temperature during the hardening operation. However, when the hardening quench is arrested at higher temperatures, not only are there increasing amounts of austenite present before tempering but there is also more and more austenite remaining in the steel after tempering. For example, if the quenching bath temperature is 225°F, about 53 pct of austenite is carried over into the tempering process, and 10 pct of austenite remains (at room temperature) after tempering for 2½ hr at 1050°F; whereas if the hardened quench is continued to 80°F there is only about 23 pct of austenite available for tempering and practically none after tempering. The maximum austenite content (22 pct) retained after such tempering occurs when the hardening quench is arrested above the martensite range (M-point = 420°F). It appears, then, that with regard to completing the austenite

** The discussion to follow is based upon work done on the tungsten-molybdenum grade of high-speed steel, but the general principles evolved apply equally to all grades.*

[19] *Gordon, P., Cohen, M., and Rose, R. S., "Effect of the Quenching Bath Temperature on the Tempering of High Speed Steel." Trans. ASM* 33, 1944, *p.* 411.

TABLE V

Structure of W-Mo High-Speed Steel After Quenching From 2225°F to Indicated Temperatures and After Tempering Directly for 2½ hr at 1050°F. Percentages are on Volume Basis

	At Bath Temperature			At Room Temperature After Tempering			
Quenching Bath Temperature °F	(a) Percent Undissolved Carbide	(b) Percent Austenite (From fig. 28)	(c) Percent Martensite (100-a-b)	(d) Percent Undissolved Carbide (= a)	(e) Percent Tempered Martensite (= c)	(f) Percent Austenite (From fig. 28)	(g) Percent Untempered Martensite* (b-f)
80	7	23	70	7	70	1	22
125	7	31	62	7	62	3	28
175	7	41	52	7	52	5	36
225	7	53	40	7	40	10	43
275	7	65	28	7	28	16	49
375	7	89	4	7	4	21	68
500	7	93	0	7	0	22	71

* The amount of untempered martensite is taken as equal to the percent of austenite which transforms as a result of tempering since this transformation takes place principally on cooling from the tempering temperature.

decomposition, tempering becomes less efficacious as the quenching bath temperature is raised.

A summary of the structural constitution of the tungsten-molybdenum steel at room temperature after arrested hardening and single tempering for 2½ hr at 1050°F is given in table V as a function of quenching-bath temperature. A study of table V shows quite clearly that arresting the hardening quench at temperatures above 80°F even when followed by normal tempering leaves not only appreciable quantities of retained austenite, but also much larger amounts of untempered martensite. Considering these effects, plus the fact that the large amount of untempered martensite forms on cooling from the tempering temperature with attendant stress-raising volume changes, it is reasonable to expect that arrested cooling on hardening might have serious consequences. This is confirmed by the results of the bend tests listed in table VI. The transverse breaking strength is definitely lowered by not cooling all the way to room temperature before tempering.

TABLE VI

Transverse Strength of W-Mo High Speed Steel After Quenching to Indicated Temperatures and Tempering Directly for 2½ hr at 1050° F

Quenching Bath Temperature, °F	Modulus of Rupture, Psi	Comparative Strength, Pct
80	434,000	100
125	363,000	84
175	287,000	66
225	309,000	71

Next week the authors discuss multiple tempering after arrested quenching, and consider the effects of interrupted cooling from tempering temperature.

Worn Parts Built Up by Automatic Welding

BUILDING up of worn surfaces with a welded deposit applied by automatic welding is reported by the Empire Oil Machinery Co. to be cutting the cost of repairs to but a fraction of the cost of new equipment.

By using a Unionmelt setup to reclaim worn brake drums for oil field machinery, it is now possible to rebuild a worn drum in only 6 hr. Previously it had been necessary to replace all worn drums with new ones. The accompanying illustration shows the rebuilding of a worn brake drum for a drilling rig. The drum is about 54 in. in diameter, with a 12-in. face, and approximately 150 lb of ¼-in. welding rod is used to rebuild the brake surface to a finished height of ⅜-in. The welded surface is then finished by either machining or grinding in approximately 2 hr.

In order to build up an even, continuous deposit over the entire worn surface, the brake drum is revolved during welding at a speed of 20 ipm, while the Type CA welding head remains stationary. The rotating device consists of a truck spindle driven by a belt from a variable-speed 1 hp electric motor. A hand-operated screw feed on the welding head support makes possible the lateral adjustment of the head. This permits the continuous deposition of material by moving the head a small distance across the brake surface after each revolution. The homemade pillar crane support allows vertical adjustment to accommodate various size drums and other miscellaneous parts.

This same setup is also used for rebuilding worn master bushings, both inside and out. Both sides of the bushing are built up approximately ¼-in. Since the inside of the bushing is tapered, it is necessary to tilt the rotating device, and also to use a special extension on the CA head to reach inside the bushing. Bushings are welded with 5/32-in. rod, and rotate at a speed of 18 ipm.

REBUILDING a worn brake drum by Unionmelt welding. This drum for an oil drilling rig was rebuilt in approximately 6 hr.

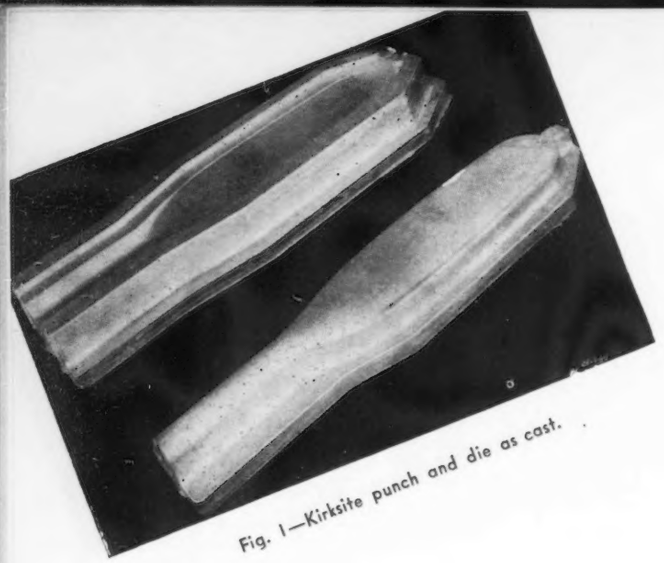


Fig. 1—Kirksite punch and die as cast.

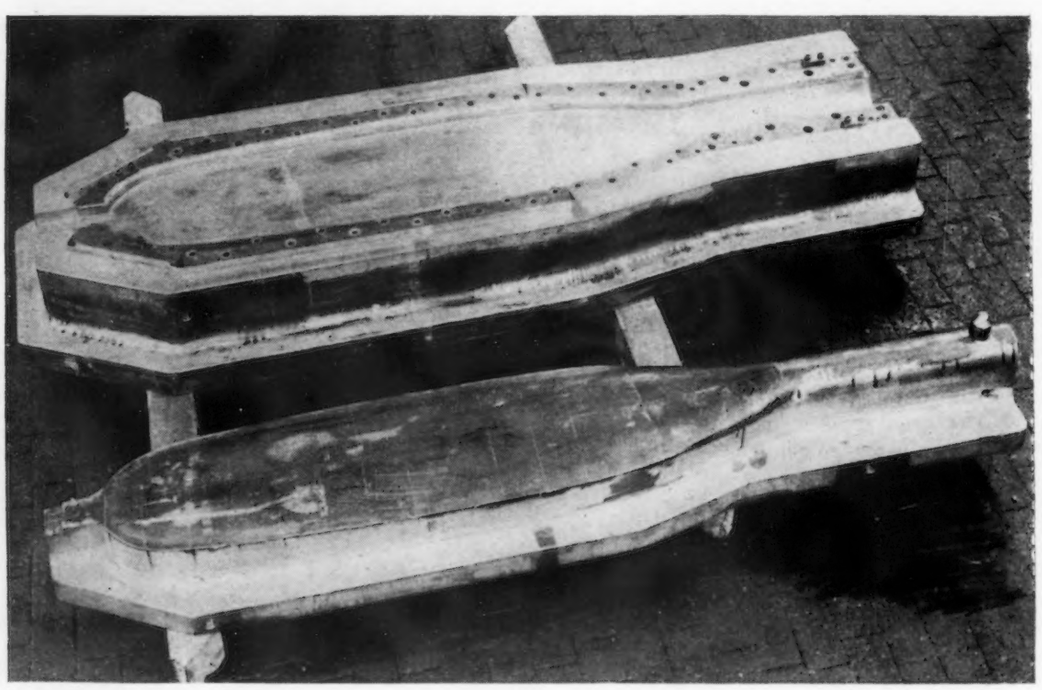
Forming Heavy

IN AN effort to reduce the cost and expedite fabrication of experimental forming dies, engineers of the Curtiss-Wright Corp. decided to investigate alloys which could be cast to size, in order to eliminate as much machining as possible. It was particularly desired to eliminate Kellering, usually a very costly operation, but at the same time it was necessary that the material selected be tough enough to form a limited number of experimental propeller blade plates of ½-in. thick SAE 4330 nickel-chromium molybdenum alloy steel.

In checking the various alloys and plastics available, it appeared that Kirksite A, a zinc-copper-aluminum alloy having physical properties far below those of the steel to be formed, came close to meeting the requirements. This alloy can be cast to within 1/64 in. per ft of the desired shape and size. It has a compressive strength of 60,000 psi, and a tensile of 36,000 psi. Since the forming was to be done on a hydraulic press using 800 tons pressure, or about 3000 psi when spread over the entire plate area, it was agreed that the Kirksite could easily withstand the loads imposed. It was feared, however, that it was too soft to take the tearing tendencies of the plates which were to be formed. In order to overcome this weakness, it was decided to cast a recess at the edges of the die, as shown in fig. 1, and to add soft tool steel inserts all around, holding these in place with capscrews as shown in fig. 2.

Although the zinc alloy in ingot form is more expensive than steel or Meehanite in raw material form, die cost of the finished dies is much less for the Kirksite, due to the elimination of the Kellering and much other machining. Moreover, dies no longer required may be remelted several times without loss of physical characteristics. The cost and time element can be reduced about 75 pct, thus making this material especially useful in experimental work where product design is continually changing. While zinc alloy dies could not be expected to replace steel or Meehanite for long-run production, what eventually controls the economy of the application is the number of parts to be made with a given die.

Both the punch and die were cast from wood patterns which had already been made for another purpose, and since these were extremely accurate it was decided to use them. In general, however, it is better to work from plaster patterns, which are cheaper and



o o o

FIG. 2—Complete punch and die with soft tool-steel inserts ready for use.

o o o

Plate With Kirksite Dies

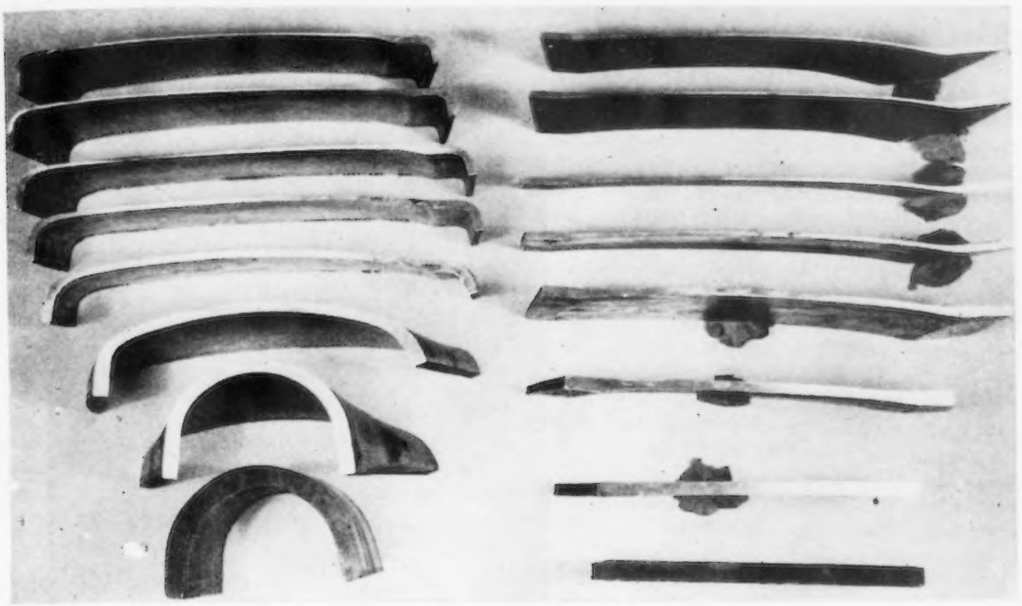
By L. R. PISTOLES

faster to produce than wooden patterns of the same degree of accuracy, and if properly stored, will not warp or distort. With the use of caution and careful foundry practice, clean, accurate castings were produced in open sand molds, as shown in fig. 1. The machining on these castings consisted of planing the top and bottom of the die pair, and profiling the punch all around to correct any minor irregularities. Holes were drilled and tapped for the insert-retaining screws. In this connection it should be noted that Kirksite can be machined much faster than steel, cutting feeds and speeds being about the same as for duraluminum alloys.

While in most cases Kirksite dies are used dry, it was believed that lubrication would be advantageous in this particular case because of the very heavy forming to be done. Two types of lubricant were tried; one a water-soluble tallow mixed 50-50, which gave fair results, and the other a 50-50 mixture of white lead and lubricating oil which yielded good results. The white lead and oil was applied to both punch and die by brushing.

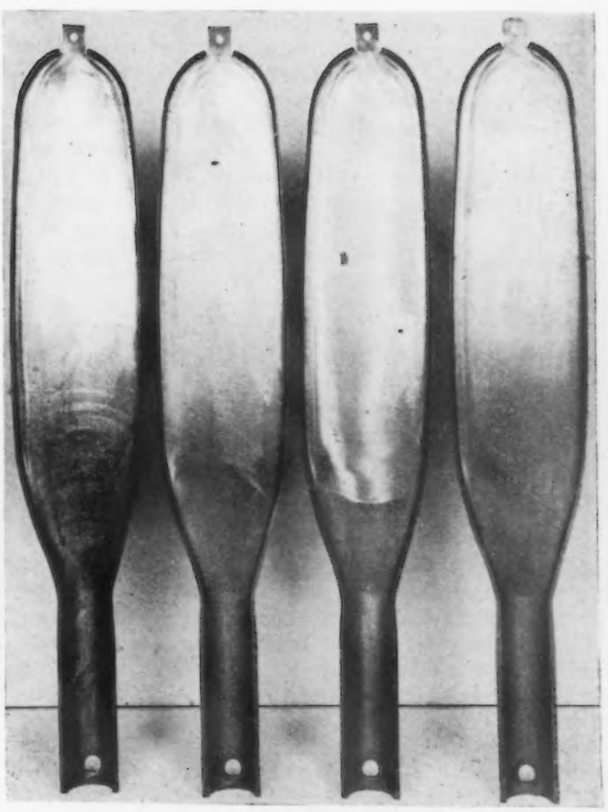
The propeller blades are formed from a tapered steel plate, 0.52-in. thick at its shank section, and tapering to 0.06-in. thick at the opposite end. It is at the shank end that the most severe forming takes place. As shown in fig. 3, it is necessary to form the heavy shank section into a full half circle of 2-in. radius. This radius decreases to ⅛ in. at the thin end of the blade as shown in fig. 4.

The results obtained with these dies have been entirely satisfactory, and while intended only for experimental use, there is little doubt that they could, if necessary, be used for limited production.



ABOVE

FIG. 3—Left, sections through a propeller blade, showing the severe forming to which the plate is subjected. Right, corresponding sections through the plate prior to forming.



BELOW

FIG. 4—View of finished blades formed on the Kirksite dies, showing the 2-in. radius at the shank gradually decreasing to a ⅛-in. radius at the thin end.

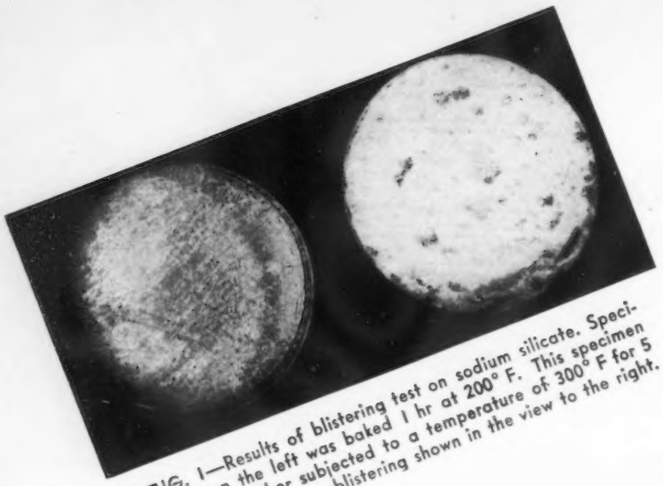


FIG. 1—Results of blistering test on sodium silicate. Specimen on the left was baked 1 hr at 200° F. This specimen was then further subjected to a temperature of 300° F for 5 min, resulting in the blistering shown in the view to the right.

• • • Impregnating

RIGID performance specifications, special alloys and intricate designs make it difficult to produce light-metal castings that are consistently entirely free of porosity. A casting is not necessarily physically unsound because of microporosity. Using castings with such characteristics is practical, provided a suitable impregnating process for sealing is employed. Such an impregnating process was first employed in the aircraft industry, where it proved a notable success.

Sealers, as such, are not new to industry. Pigmented enamels, varnishes and drying oils have been used for a number of years as surface coatings for sealing porous castings. For modern requirements, surface treatment is entirely unsatisfactory, for such treatment does not fill the porosity nor does it become an integral part of the casting.

On the other hand, impregnation—forcing the agent or sealer into and throughout the microporosity—is an entirely different approach. Impregnation causes the sealing agent to become a definite part of the casting. Sodium silicate (water glass) is accepted by many foundrymen as a satisfactory sealer. It is alkaline and consequently is reactive with such metals as zinc, aluminum and magnesium. Since it is a silicate and thus abrasive in nature, extreme care must be taken in cleaning castings not to impair delicate bearing surfaces.

Probably one of the most critical disadvantages of water glass is the fact that it is over 50 pct water. As the water leaves the solution, a gel forms, making it extremely difficult to completely dry or dehydrate an impregnated casting. Castings may pass a certain pressure test, on aging the residual moisture dries out, thus causing leakage to reoccur.

Fig. 1 shows a sample of sodium silicate that was baked 1 hr at 200°F forming a very smooth hard film, containing less than 1 pct moisture. However, on baking at 300°F or over the boiling point of water, foaming occurred, as the photo (right), fig. 1, indicates. The residual moisture was liberated at the higher temperature, causing a violent reaction and forming waters and blisters.

The photograph in fig. 2 illustrates the shrinkage that occurs on baking water glass. The silica has shrunk to less than 50 pct of its original volume, indicating the low efficiency of water glass as a sealer when impregnated in casting porosity. This illustrates why castings often have to be impregnated three and four times where water glass is used.

A common method of using water glass is to immerse the casting in a hot solution, about 190°F. This causes some superficial or surface penetration. In the case of reactive metals, such as aluminum and magnesium, it is believed that what sealing is achieved by this immersion is largely due to the corrosive action of the silica.

Varnishes containing 50 pct or more solvent, which must evaporate before drying is completed, have all the disadvantages of water glass for they require baking at low temperatures for long periods to prevent the formation of blisters as the solvent evaporates. Too, if the solvent is not all volatilized, shrinkage may occur later causing the porosity to reopen.

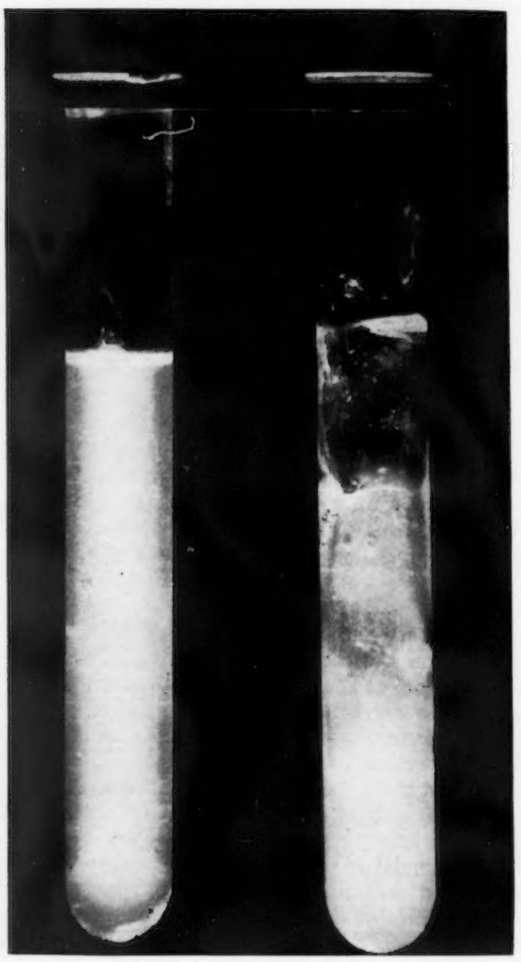


FIG. 2—Shrinkage test on sodium silicate. Sample in test tube on left is in the before-baking condition. This sample was baked for 48 hr at 205° F with the result shown to the right. The shrinkage after baking was approximately 50 pct.

The desirability of a compound containing no

Magnesium Castings . . .

By SAMUEL A. MOORE
*Finishes *Division, Interchemical Corp., New York*

Behavior of various types of impregnating agents, with particular reference to the relationship of baking time and pressure to the efficacy of the sealing action. Considerable data are also given on a resin-styrene compound which is nonthermoplastic and does not require an explosive chemical catalyst.

volatile ingredients is apparent. Organic compounds based on vegetable oils have been found much superior to the silicates in this respect. China wood oil (tung oil) particularly has moderate drying properties and comparatively low viscosity. Yet in terms of efficiency and/or complete impregnation, its viscosity is high. It must be applied hot to reduce its viscosity. This causes the oil to polymerize and become more viscous, finally defeating its purpose.

It was logical to try to develop a means of using vegetable oils that had previously been found unsuitable. The use of monomeric styrene in connection with dehydrated castor oil or linseed oil was introduced as a means to this end. Monomeric styrene is a reactive solvent and is also resin forming, converting to polystyrene when catalyzed with benzoyl peroxide (Lucidol) and heat.

Such styrene-oil mixtures are improvements over the original tung oil process, but they still remain improvised mixtures with definite disadvantages. It is believed the catalytic action of benzoyl peroxide and heat merely converts the monomeric styrene to polystyrene, while the oil oxidizes or polymerizes separately, that is, no copolymerization takes place.

It is known that polystyrene is thermoplastic for it is used in this manner by the plastics industry. Additions of drying oils to monomeric styrene only partially overcome this thermoplasticity. Polystyrene is also gasoline soluble. Fig. 3 shows the disintegration of a linseed oil-styrene polymer that takes place after 120-hr immersion in high octane gasoline at 85° F. The linseed oil specimen was heat polymerized 30,000 to 40,000 centistokes and mixed 19 parts with 80 parts monomeric styrene. Catalyst was added at the ratio of 1⅓ oz per gal of impregnating solution. Considerable polystyrene probably went into solution with gasoline, causing complete disintegration of the baked resin into a sludge. The only physical change in the resin-styrene sample (to right in photo) is a slight softening and swelling which is actually a desirable property. Probably one of the greatest objections to the oil-styrene mixtures is the use of the expensive and highly explosive benzoyl peroxide. It adds considerable to the insurance risk of an impregnating operation. Nevertheless, such mixtures have shown the value of using a 100 pct resin converting impregnant. Monomeric styrene, by virtue of its solvent action, makes possible a thin and 100 pct reactive sealer. This is shown in fig. 4.

Consequently, a new approach was not to improvise

ABOVE

FIG. 3—Solubility test involving immersion in high-octane gasoline for 120 hr at 85° F. Specimen on the left is a linseed oil-styrene mixture, while sample on the right is the No. 988 resin-styrene compound. Both specimens were baked 2 hr at 275° F.

RIGHT

FIG. 4—Absence of shrinkage of resin-styrene mixture after baking is illustrated in this photograph. Tube on left is the compound before baking, while specimen on the right is the sample after baking 2 hr at 275° F.

a mixture, but to tailor-make a resin for reacting with monomeric styrene. By doing so it was believed the objections of thermoplasticity, gas solubility and the use of explosive catalysts could be overcome. A resin to meet these requirements was developed by Interchemical Corp. and is identified as No. 988 metal impregnating compound.*

This new resin is reactive and will copolymerize with the reactive monomeric styrene. The resultant product on baking, has properties all its own, is nonthermoplastic and highly gasoline resistant. The photograph, fig. 3, also shows the excellent gasoline resistance of the completely cured No. 988 Resin-Styrene copolymer. Since it does not require an explosive chemical catalyst, considerable fire hazard is avoided.

* *See* THE IRON AGE, *Aug* 10, 1944, *p.* 63.

The preparation of a styrene solution with No. 988 requires no technical control for no catalysts are required. After the desired impregnating viscosity is determined, the proper proportions of No. 988 and styrene are mixed together.

For nearly all microporosity, a mixture of 50 parts resin and 50 parts styrene will give the proper viscosity for complete sealing. However, porosity exists in varying degrees and so other ratios may be desired. Fig. 5 shows how the viscosity is affected by varying the amount of No. 988 resin in the solution. This chart also indicates the viscosity of various mixtures.

As previously indicated, No. 988 resin copolymerizes with monomeric styrene. This serves several purposes in addition to creating a copolymer having excellent properties. The molecular size of both No. 988 and styrene is relatively small before copolymerization.

This, in addition to the low viscosity, makes for complete penetration into the smallest capillary-like pores. Then, too, on baking (polymerization) the liquid quickly converts to a gel, thus it is virtually frozen in the pores of the casting. The time required for the solution to convert from the liquid stage is called the gel time.

This time factor is greatly affected by temperature and may vary from 10 min at 300° F to 100 min at 225° F for a solution composed of 40 parts No. 988 resin and 60 parts styrene. This time effect is graphically illustrated in fig. 6.

The curve in fig. 6 does not represent time and temperature for complete polymerization, but only for approximately 80 pct of the reaction. It represents the point at which the impregnating solution converts from a liquid to a solid gel. It also represents the point from which the temperature can be safely elevated to over 300° F without danger of volatilizing monomeric styrene before polymerization takes place. These tests were made on 8-g test-tube samples which were heated in an oil bath. The procedure for determining the gel point was similar to the Brown heat test.

Gel time is not greatly affected by varying the mixture. It is only slightly increased by additions of resin. This is graphically illustrated in fig. 7 where several mixtures were all baked at 275° F. Gel time for this test was determined by placing a glass rod in 8 g test tube sample and noting the time required to form a gel stiff enough so the rod would lift or hold the suspended test tube.

It is important for a number of applications to know the solubility of the baked copolymer. The data in table III, compiled by the Allison Engine Division, General Motors Corp., show the resistance to several agents.

Monomeric styrene is a volatile liquid having a boiling point just under 300° F. It is important that impregnated castings are not baked over 300° F (at atmospheric pressure) to avoid the loss of styrene before polymerization takes place. If baking can be done under pressure, loss will be minimized. This is illustrated in table I which shows the weight loss of test tube samples composed of 40 parts No. 988 resin and 60 parts styrene when baked under 100 psi. It will be noted that when baking is done under pressure, the loss is practically nil, or less than 1 pct, while at atmospheric pressure the loss is about 4.5 pct. Hence, where possible, for this and other reasons, the use of pressure tanks is recommended.

TABLE I
Loss By Weight

Baking 2 hr at 275° F under 100 psi pressure

	Sample Weight Before Baking	Sample Weight After Baking	Sample Loss by Weight	Pct Loss
Sample No. 1...	8.9852	8.9147	0.0705	0.79
Sample No. 2...	9.7946	9.7093	0.0853	0.87
Average.....	.....	.....	.....	0.83

Baking 2 hr at 275° F at atmospheric pressure

	Sample Weight Before Baking	Sample Weight After Baking	Sample Loss by Weight	Pct Loss
Sample No. 1...	10.3256	9.8869	0.4387	4.25
Sample No. 2...	9.8111	9.3871	0.424	4.32
Average.....	.....	.....	.....	4.28

There are also other advantages to pressure baking* worthy of mention. Polymerization usually is more rapid under pressure, thus making possible a shorter baking time. Too, the boiling point of styrene at 100 psi (over 500° F) is much higher than at normal pressure.

* *See "Magnesium Castings Impregnated by New Method,"* THE IRON AGE, *Nov.* 11, 1943, *p.* 57.

TABLE II
Loss By Weight

Baking time 1¼ hr at 325° F. Pressure = 100 psi.

	Sample Weight Before Baking	Sample Weight After Baking	Sample Loss by Weight	Pct Loss
Sample No. 1...	8.3225	8.1885	0.1340	1.61
Sample No. 2...	8.8850	8.7725	0.1125	1.27
Average.....	.....	.....	.....	1.44

Baking time 1¼ hr at 325° F. Pressure = Atmospheric

	Sample Weight Before Baking	Sample Weight After Baking	Sample Loss by Weight	Pct Loss
Sample No. 1...	13.5737	11.8882	1.6855	12.4
Sample No. 2...	14.1678	11.6232	2.5446	17.9
Average.....	.....	.....	.....	15.1

Therefore, baking at 100 psi makes possible the use of higher temperatures with a corresponding shorter time cycle. Table II shows the loss by weight of 40 parts No. 988 resin and 60 parts styrene, (test-tube samples) baked at 325° F for 1¼ hr under 100 psi compared with similar samples baked at atmospheric pressure.

The 325° F temperature is well over the normal boiling range of monomeric styrene. However the 100 psi safely overcomes this by raising the boiling point to over 500° F. Hence the loss under 100 psi pressure is negligible, or 1.44 pct by weight, while the loss at atmospheric pressure is 15.1 pct by weight.

Metal parts may be impregnated for sealing either before or after machining operations. It is desirable, though, that the castings be previously given a slight etch, such as the common chrome-pickle treatment given magnesium. The only precaution necessary is

TABLE III

Solubility of Baked Copolymer

Solvent	Length of Immersion	Temperature of Solvent °F	Weight of Panel Plus Copolymer	Weight of Panel Plus Copolymer After Solubility Test	Weight of Copolymer Removed by 100 ml. Solvent
ANVV-O-446 1120 Oil.....	24 hr	250	3.4200	3.4170	0.0030
	24 hr	250	3.3085	3.3038	0.0047
Ethylene Glycol..	24 hr	250	3.3977	3.3583	0.0394
	24 hr	250	3.3396	3.2961	0.0435
Oakite Aviation Cleaner (6 oz/gal).....	1 hr	180	3.2340	3.1940	0.0400
	1 hr	180	3.3460	3.3120	0.0340
Mineral Spirits...	2 hr	80	3.2345	3.2340	0.0005
	2 hr	80	3.3538	3.3518	0.0020
100 Octane Fuel..	2 hr	80	3.2279	3.2269	0.0010
	2 hr	80	3.4022	3.4012	0.0010
Trichlorethylene..	1 hr	190	3.2310	3.2164	0.0146
	1 hr	190	3.3018	3.2834	0.0184

that all surfaces be clean and free of foreign matter such as oil and grease. The casting should be dry from previous cleaning or pickling operations. Occasionally it is recommended that castings be pre-dried under heat (1 hr at 250° F) before impregnating to remove entrapped moisture vapors.

There is considerable evidence that gas, particularly hydrogen, goes into solution with metals. More is dissolved in a molten state then after the metal is frozen. Data provided by the Dow Chemical Co. for magnesium, which dissolves less hydrogen than other metals, are 0.003 pct in the liquid and 0.0015 pct in the solid at the freezing point. It can be presumed from this that microporosity likely is due not only to excessive contraction of the metals but also to the evolution of dissolved hydrogen gas during solidification. It follows then that the most effective method of impregnation is where this gas is as completely removed, or nearly completely removed, as by the vacuum-pressure process.

This entails the use of a large sealed tank (autoclave) and a source of vacuum. A vacuum of approximately 28 in. for a minimum of 15 min is created to remove all air and gases, although a longer vacuum period is often desirable and is recommended. After the complete removal of gases, the vacuum is allowed to draw the solution into the tank, thoroughly cover-

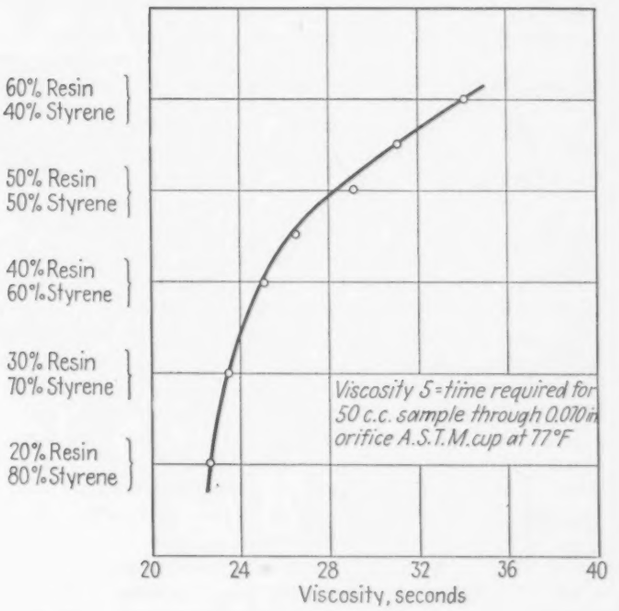
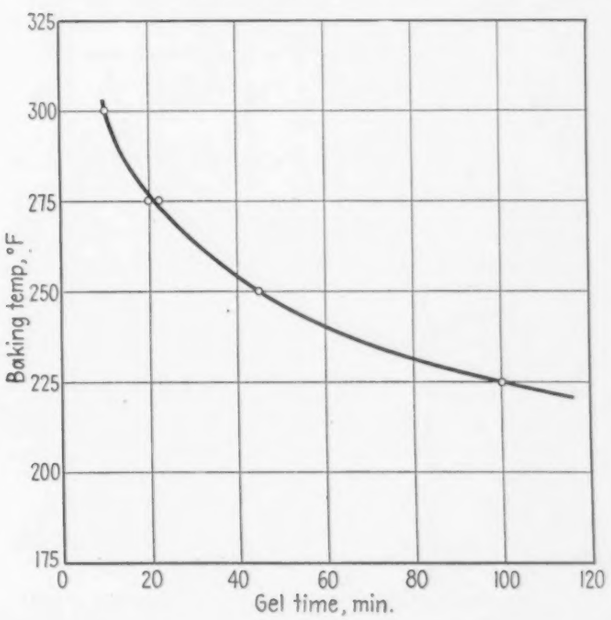


FIG. 5—Viscosity of various No. 988 resin-styrene mixtures. A mixture of 50 parts resin and 50 parts styrene will give proper viscosity for most sealing operations.

ing all parts. The 28-in. vacuum is then held from 3 to 5 min after which pressure of 50 to 90 psi is applied to further force the liquid into the casting porosity. The liquid is then drawn off and the metal parts allowed to drain. Cleaning may be in either a solvent cleaner or a stabilized alkali water washing machine.

Vapor degreasers (parachlorethylene) are occasionally used. However, the hot vapor is apt to heat the castings and remove the impregnant from the surface porosity, partly destroying the seal. After cleaning the castings are ready for baking.* Proper baking schedules after impregnation, as previously discussed,

FIG. 6—Effect of temperature on gel time of mixture of 40 parts No. 988 resin and 60 parts styrene.



can vary considerably. The general recommendation is 2 hr at 275° F or 40 min at 275° F plus 50 min at 325° F. As previously indicated, where pressure is used baking can exceed 300° F for a shorter period.

* *See "Drying Impregnated Castings,"* THE IRON AGE, *Dec. 9, 1943, p. 64.*

A simpler method, but less effective, is merely to immerse the warm casting in an open tank of cold solution. The thermal change causes some penetration. Care must be taken to keep the tank cool, approximately 65° F. Neither of these methods is totally satisfactory for they do not remove the included gases, as does the vacuum pressure procedure.

While the No. 988 resin-styrene solution is reactive, it is sufficiently stable for normal factory working cycles. Samples maintained at 68° F have remained stable for more than 3 months. Considering that a factory impregnating tank is cooled by water run through coils and has daily additions of fresh material, stability is perpetuated and no difficulty is encountered. Often castings or metal parts are impregnated while still warm from previous processing or cleaning operations, which may have a tendency to overheat the impregnating solution. Therefore, the storage tank, too, should be water cooled to maintain a constant solution temperature of 65 to 70° F. The Dow Chemical Co.'s DMI styrene was used throughout stability tests conducted by the author and was found quite satisfactory. Any suitable stabilized styrene may be used.

Copper and brass are reactive with monomeric styrene forming a compound that may interfere with its polymerization. For this reason there has been developed by Interchemical Corp. a special resin that prevents the inhibiting effect of copper when mixed with styrene. Otherwise storage tanks, impregnating equipment, etc., should contain no brass or bronze fittings or copper parts. Bare iron or tin is quite satisfactory.

This special copper-resistant resin was prepared to seal bronze or brass castings, or for use with copper. Its properties, when mixed with styrene, are much the same as the No. 988.

The question is often asked "What is the best means of obtaining pressure for vacuum-pressure impregnating and for the baking operation that follows?" No special precautions are necessary other than those taken for handling normal paints and varnishes. However, if an inert gas is available, such as carbon dioxide or nitrogen, it is preferred.

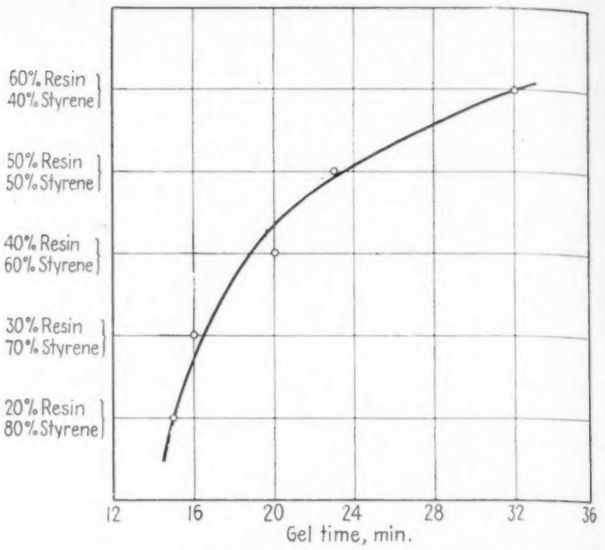


FIG. 7—Effect of resin additions on gel time. All specimens baked at 275° F. Mixtures consisted of monomeric styrene and varying proportions of No. 988 resin.

Bleeding or exudation is sometimes encountered with all types of impregnating compounds. It comes from many causes, but basically it is due to pressure within the porosity forcing the impregnant to the surface of the casting. If an orthodox type of varnish containing solvents such as turpentine or naphtha is used, the pressure may be due to the solvent gases forcing their way outward. The water in a sodium-silicate solution can produce this effect.

One of the advantages of a No. 988 styrene solution is that it rapidly polymerizes without the evaporation of volatile matter. Probably one of the most frequent causes of bleeding is from included gases within the casting not completely removed during the vacuum cycle. During solidification of molten metal, soluble gases sometimes become partially entrapped in the capillary pores. If not completely removed by vacuum, they may gradually work out to the larger pores and cause the impregnant to exude or bleed. By holding the vacuum for a longer period bleeding will often be overcome where no other cause is apparent.

Physical Reaction of Crystalline Structures

THE characteristic properties of metals and the factors determining their mechanical strength are explained by L. Bragg in *Engineering*, 1945, vol. 160, in terms of physical reactions.

In the initial annealed state there are large regions of highly perfect crystalline structure in the metal. When slip occurs, it runs for long distances, the parameter t (the average distance between faults, where unconformable mosaic elements meet) being large, and the yield point low, but this very act of yielding creates dislocations which form new interfaces where differently orientated mosaic fragments meet. The parameter t diminishes and the crystal becomes stronger.

At the same time the interfaces are centers of highly localized strain in which the energy of coldwork resides. As deformation proceeds, the mosaic elements yield one after another along a plane of slip where the atoms move on one each time. The largest elements are the weakest and yield first. The process cannot be carried on beyond a certain limit because of the recrystallizing power of the metal.

Regardless of the amount of coldwork is put into the metal, a limiting amount only can be retained. This corresponds to the crystal structure being broken into fragments of limiting small size fitting as unconformably to each other as is possible geometrically. When this limit is reached, the elastic limit of the metal is determined approximately by $ns \div t$, where n is the rigidity modulus, and s the distance between neighboring atoms.

New Equipment . . .

Plant Service

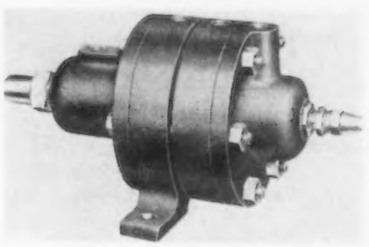
. . . In this week's issue are described interesting developments in plant service, including automatic clutches, air conditioners, metal parts washers, static eliminators, speed control valves, compact regulators, floor cleaners and handy labels.

TWO scientifically designed finger cots, available in small, medium and large sizes, have been announced by *American Optical Co.*, Southbridge, Mass. One of the AO Sta-Set cots, said to be made from selected grain leather, is useful wherever sensitivity of touch is an important factor, such as soldering small wire and assembly work. The second cot is made from high grade chrome tanned cowhide leather and is recommended for jobs involving hard usage, such as polishing, burring, and grinding small parts. These cots are said to provide rugged protection for both front and back of fingers, and are designed to stay in place. The soft, pliable leather used in making the cots plus

an elastic strap in back at the bottom permit complete freedom of movement.

Pneumatic Relay

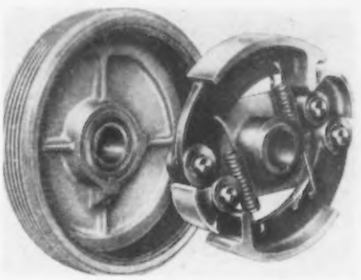
A PILOT-OPERATED, pneumatic relay of versatility, used to add or subtract loading pressures received from external sources, has been announced by Hagan Corp., Hagan Bldg., Pittsburgh. Known as type F Totalizer, this device is also used as a regulator. It may be used in connection with a measuring flow element and a power unit to regulate fluid flow, temperature, pressure, level, speed, or any other physical condition that can be transformed into a loading pressure as an indication of magnitude. When used as an element in a control system, it is claimed



this device may perform any of the following functions: (1) add or subtract loading pressures, thereby totalizing fuels to a boiler or furnace fired with multiple fuels, or setting up the flow of auxiliary fuels; (2) act as a selector of loading; (3) respond to loading pressures sequentially; (4) operate as a safety relay; and (5) act as a pneumatic stop for diaphragm-operated valves and receiving regulators.

Automatic Clutch

INSTALLED directly on the shaft of any engine or electric motor an automatic clutch has been announced by *Salsbury Motors, Inc.*, 4464 District Blvd., Los Angeles 11. Known as the Salsbury automatic clutch, the device, by centrifugal action, is said to progressively apply the power to the driven machine. It engages and disengages without human control. This clutch is claimed to offer the advantages of a fluid drive, but in



addition permits complete disengagement while idling and positive engagement when driving, with no possibility of slippage. The clutch is an opposed shoe type, dual-spring balanced to give the desired degree of tension required for individual applications. Below a predetermined rpm of an engine or motor, the clutch idles; when the driving rpm increases beyond the stipulated rpm the expansion shoes press outwardly, contacting the friction lining of the drum.

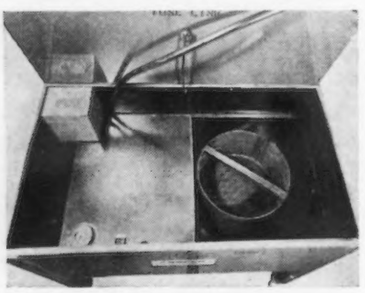
Pipe Sealing Compound

KNOWN as Black Magic, a pipe sealing compound and gasket cement has been announced by *Bowser, Inc.*, Fort Wayne 5, Ind. It can be used for gasoline, oils, water, steam and a large variety of other liquids except those containing alcohol or made with an alcohol base. This compound is said to form a permanent seal in pipe joint or gasket, yet retains enough flexibility to permit expansion and contraction of metals without cracking. There is no mixing, no waste, and the convenient tube

keeps the compound fresh and ready to use in its original consistency.

Metal Parts Washer

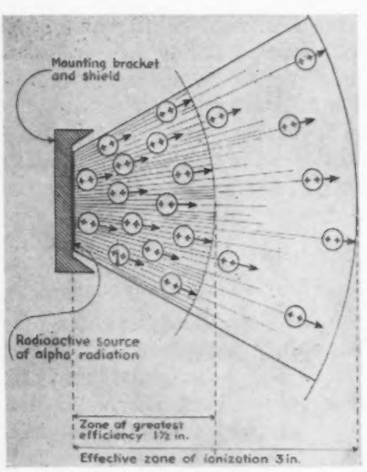
THE development of a metal parts washer for large or small plants has been announced by *The D. C. Cooper Co.*, 1467 S. Michigan Ave., Chicago 5. This metal parts washer is said to be equipped with



special spray hose, electric motor, spray pump and sturdy basket for handling small parts. Special gage tells at a glance amount of solvent in tank and only one cleaning operation is required for all types of metals including aluminum, pewter, white metal, steel and iron.

Static Eliminator

EFFICIENT, economical elimination of static electricity from machinery and from moving paper, plastic sheeting, textiles, and other materials is made possible


Mounting bracket and shield
Radioactive source of alpha radiation
Zone of greatest efficiency 1½ in.
Effective zone of ionization 3 in.

with a device called the Ionotron static eliminator announced by *United States Radium Corp.*, N. Y. The device has no moving parts and requires no electrical connections. Research and special wartime applications indicate its adoption by industry for eliminating production problems due to static, and for safeguarding hazardous processes where static is a possible cause of ignition of flammable solids, liquids or gases.

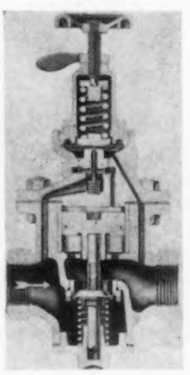
Oil Rectifier

AN oil clarifier said to remove 95 to 98 pct of all chips, abrasives and other solid contamination from oils and coolants used in machine tool operations, has been announced by *Honan-Crane Corp.*, 910 Sixth St., Lebanon, Ind. These clarifiers function continuously to remove abrasives as fast as they are liberated, assuring a constant flow of clean oil or coolant to machine tools at virtually no operating cost. The cycle of operation is automatic with exception of short pe-

riods required for removal of accumulated abrasives from the cotton tubing or to replace tubing when necessary. Makers of the clarifier claim that its removal of dirt and abrasives from oils and coolants will, in most cases, eliminate outbreaks of skin infections; allow better finish on products; lengthen tool life; reduce time lost in grinding tools and dressing stones; cut rejections to a minimum; allow more continuous operation of machines, and greatly extend the life of oil, which can be used indefinitely.

Air Reducing Valve

AN improved type of internal pilot operated air reducing valve, known as class L-1A, has been announced by *Leslie Co.*, 130 Delafield Ave., Lyndhurst, N. J. Steady, accurate regulation and tight closing in dead-end service are claimed to be provided. Among the main features of this valve, are its stability under all flow conditions, and its responsive instant reaction to widest and most sudden variations in load. Plastic inserts in the valve seats provide positive tight shutoff and long life. All wearing parts are renewable and complete interchangeability facilitates overhauling without removal from the pipe line. Corrosion and wear resistance, is obtained by the



use of stainless steel main valve, bronze controlling valve and corrosion resistant piston rings.

Hand Fire Extinguisher

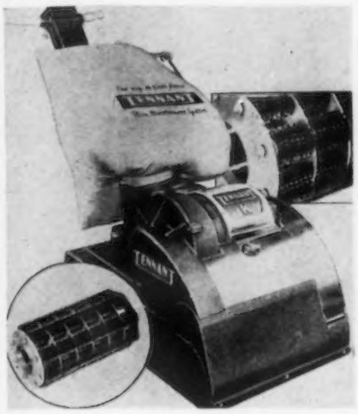
A CARBON dioxide hand fire extinguisher with unique design and quick operating features has been announced by *The B. F. Goodrich Co.*, Akron, Ohio. The container is said to hold 4 lb of carbon

dioxide and comes with a carrying handle and control button designed for fast operation. It can be easily carried in one hand, with the thumb of the carrying hand operating the push button. A horn swivel quickly raises or lowers as needed, remaining in lower position when

attached to the wall rack furnished with each extinguisher, together with a quick release chain.

Floor Cleaner

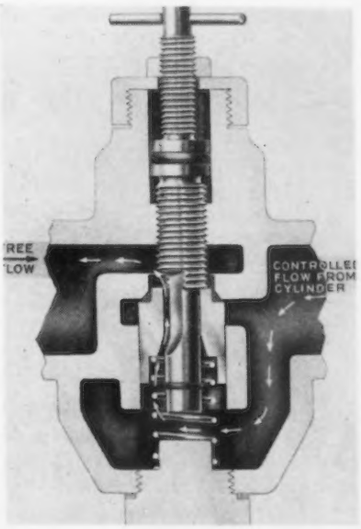
FOR removing hardened grease, dirt, pitch, tar, dried paint, cement splashes and other extra-heavy soilage from heavy-traffic industrial floors, the *G. H. Tennant Co.*, 2530 Second St., Minneapolis 11, has announced a 6 hp gasoline or electric self-propelling floor machine equipped with a heavy drum-mounted rotary cutter attachment. This device revolves at 1750 rpm and has



a hammer mill pulverizing and chipping action which, it is claimed, shears incrusted grime from floors at a faster rate than any other method. Of special importance is the discovery that this machine readily removes unsound sections of wood or concrete floors in floor-laying operations. It also levels concrete slabs prior to application of mastic, cement or other material.

Speed Control Valve

TO provide an unlimited range of selectivity in the volume of air, thereby giving split-second control of the piston speed, is the purpose of the Ross speed control valve, announced by *Ross Operating Valve Co.*, 6459 Epworth Blvd., Detroit 10. As shown by the cutaway view, both the principle and construction are very simple. There are but two moving parts, stem and poppet, with the stem so shaped as to form a venturi for the passage of air in small volume. As the threaded stem is turned downward from a closed position, incoming air in small volume is allowed to pass through the venturi into the outlet passage, increasing in volume as the stem is lowered. Continued turning of the stem causes a flange on the stem to open the poppet, permitting further



increase in volume to full flow. Return air is at full flow.

Flexible Duct

NOW available as a ducting for hot or cold air, Airtron, created during the war for aircraft heating and ventilating, has been announced by *Arrowhead Rubber Co.*, 2244 E. 37th St., Los Angeles 11. It is made of glass cloth and rubber, and is said to provide very high insulation qualities as well as great flexibility. The flexibility makes its use very desirable where vibration is present, for it will operate indefinitely under conditions where metal ducting would develop fatigue cracks. This material is claimed to withstand temperatures from minus 60° to 300°F without a change in properties and will stand

well over 50 psi internal pressure at all temperatures. It is unaffected by air, light, water, gasoline, oil and all but concentrated mineral acids.

Compact Regulator

THE small and compact Grove Mity-Mite Regulator weighing less than 2 lb and measuring roughly 2¾ x 3¼ in., has been announced by *Grove Regulator Co.*, 6419 65th St., Oakland 8, Calif. This regulator is suitable for handling initial pressures up to 3500 lb with adjustable control range from 5 lb to 1500 lb. Special models can be supplied for higher initial pressures ranging up to a maximum of 5000 lb. Although primarily designed for air and gases, including hydrogen, nitrogen and oxygen, this unit can also be furnished for liquid service. Its strength is attributable to stainless steel ports and the homogenous structure of Duraluminum from which it is made. Available for ⅛ and ¼-in. pipe size, this tiny unit was originally developed and thoroughly proved in wartime service, where it was extensively employed in controlling the actuating

medium on rockets and pack type flame throwers.

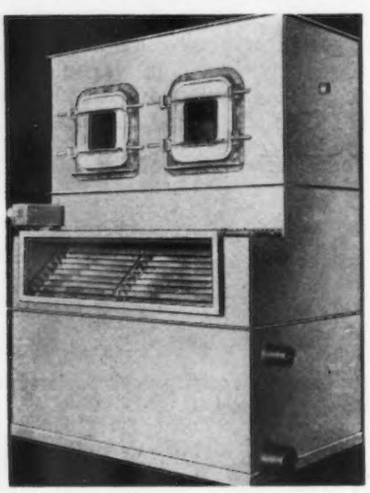
Metal Identifying Unit

THE Femco Metalsorter, type AX, has been announced by *Farmers Engineering & Mfg. Co.*, 549 Brushton Ave., Pittsburgh 21. It is portable, very simple to operate, of rugged construction and requires no special electrical power supply and makes non-destructive tests on finished products. A metallic specimen of standard, known or acceptable character is rubbed against the surface of an unknown or doubtful piece. If a chemical or metallurgical dissimilarity of the two pieces exists, a minute electrical current is generated and is registered by an indicator on a calibrated scale. When there is no dissimilarity, no electrical current is indicated. When the Metalsorter is carried from one place to another, the tools and accessories are housed in the control unit cabinet. Portability, speed of testing and flexibility of application permits this device to be used on all shapes and sizes in the mill, warehouses, receiving and shipping platforms, laboratory, or production and assembly lines. Since the Metalsorter test is absolutely non-destructive, it may be applied to the identification of built-up machinery

and aircraft assemblies and structures. The fact that pieces being tested are in metallic and electrical contact with adjoining members does not affect accuracy of test.

Air Conditioner

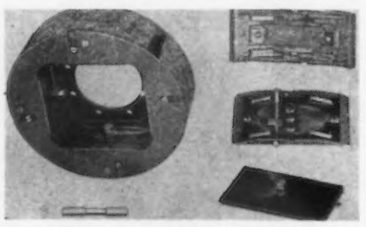
IN addition to present units, a vertical contactor of heavy duty construction is offered in the Kathabar unit announced by *Surface Combustion Corp.*, Toledo 1. This unit is claimed to be especially designed for larger industrial applications where close control of humidity is necessary to maintain



product quality and to insure continuous production. These units are said to be useful in foundries, and in the manufacturing of glass, matches, photographic film, pharmaceuticals, foods and other processing operations requiring controlled humidity atmospheres in quantities from 10,000 to 70,000 cfm. Smaller package units from 1350 to 5000 cfm and large central systems are also available.

Industrial Brake

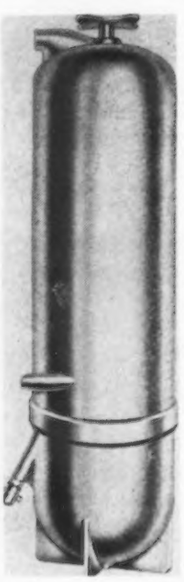
AN industrial brake which operates on ordinary factory airline pressures and yet is said to be capable of exerting as much braking effort as conventional brakes using ten times this pressure, has been announced by *Linderman Devices, Inc.*, Newburgh, N. Y. Outstanding feature of the industrial brake is that practically the entire drum (about 90 pct) is filled with lining, which under brake application is pressed radially outward against the drum with the same pressure under each square inch of lining. The brake may be used either to stop or retard industrial equipment or to provide a constant tension or braking effort. The entire brake is self-contained, and the four multi-stage diaphragms which actuate the



shoes are interconnected to assure equalized pressure on all parts of the brake circumference.

Grinder Coolant Filter

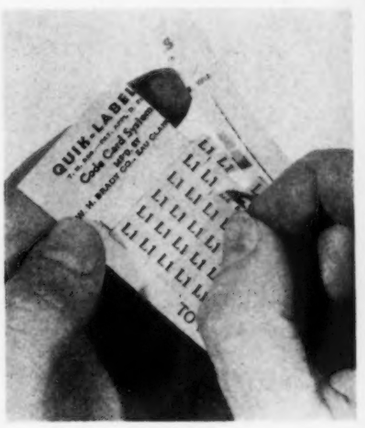
A FILTER for cleaning grinder coolant and similar solid-bearing fluids has been announced by *Cuno Engineering Corp.*, Meriden, Conn. The Coolant Klean, as this filter is called, has a replaceable filter element mounted on a screen spacer so as to provide a large filtering area (1000 sq in.) for full flow. No filter aid is needed, and precoating time is eliminated. Fine finishes are claimed to be obtained over a long period of time, often extending up to six weeks, without replacing the element. It is pointed out that with the element maintaining its effectiveness, the coolant stays cleaner and needs changing less often and there is less loading



of the grinding wheel. This filter can be applied to any type of grinder and is also adaptable to almost any machine using a coolant or cutting oil.

Handy Labels

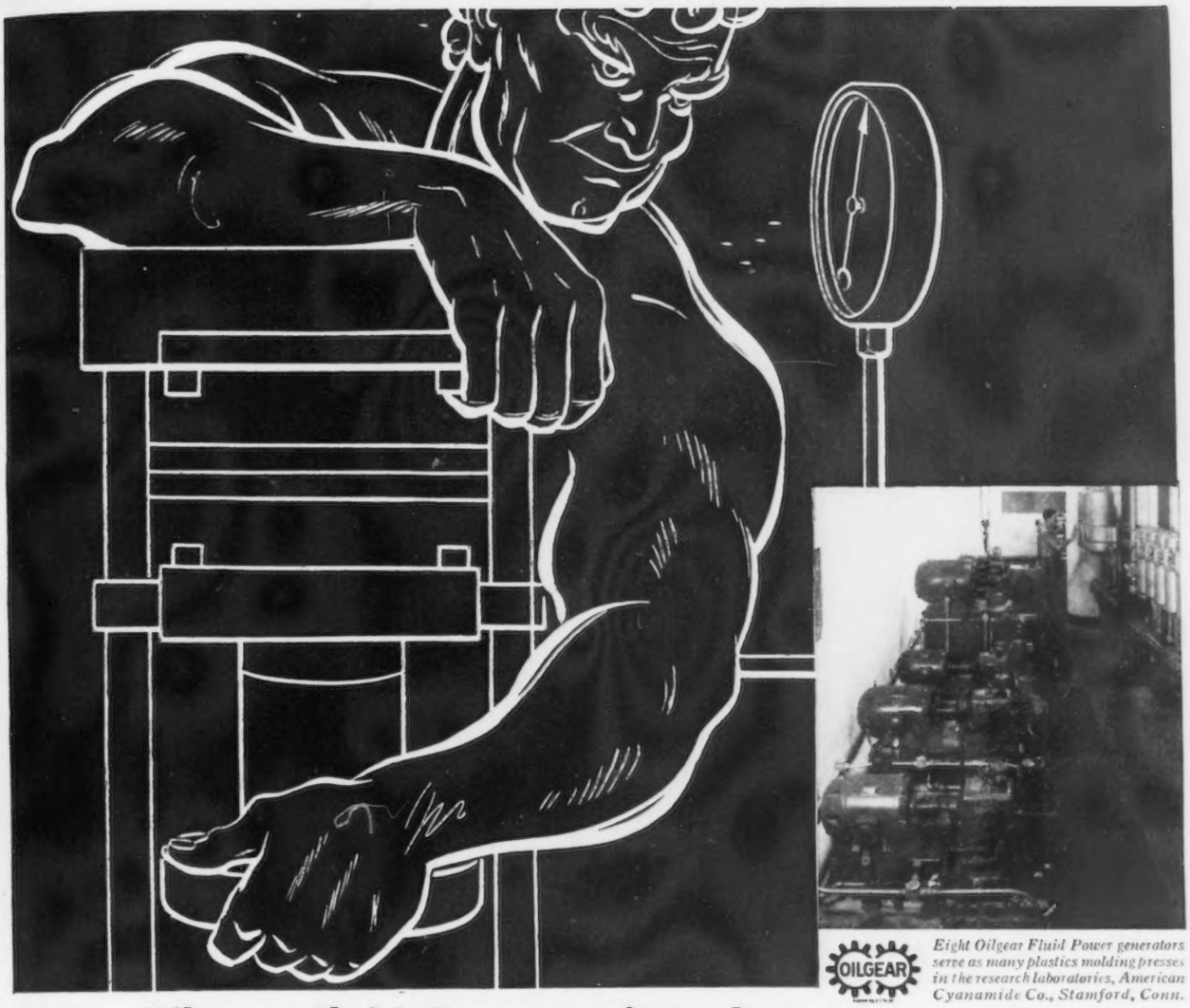
TO speed up and simplify the marking or coding of wires, motor leads, harnesses, circuits, conduits, relays, coils, terminal boards, fuse blocks and cables, Quik-Labels have been announced by the *W. H. Brady Co.*, 2904M-E. Linwoode Ave., Milwaukee 11. They are said to provide permanent, legible identification and to stick quickly without moistening to any round or flat surface. Pre-cut to exact size, these labels come on handy code cards always ready for instant use. Labels are peeled from the card by means



of the self-starter feature which automatically exposes the ends of the labels, permitting them to be pulled off quickly without laborious finger picking or difficult prying of corners or edges. More than 200 different code cards are available, including 14 colors, to meet the requirements of all types of electrical production and maintenance problems.

Motor Lubricant

FOR lubrication from 13° to 176°F for all speeds up to 3600 rpm and for horizontal or vertical operation, an improved grease for ball and roller bearing motors has been announced by the *Westinghouse Electric Corp.*, 306 Fourth Ave., Pittsburgh 30. Available in an 8-oz nasal type tube, the grease is said to be stable, highly resistant to oxidation, and will remain in a bearing for an indefinite period without drying out, caking or separating. The tube is designed for easy and economical use, and has a large opening in the long nasal spout which fits into a ⅛-in. pipe coupling, and a key with which to wind and exert pressure from the bottom of the tube.



Eight Oilgear Fluid Power generators serve as many plastics molding presses in the research laboratories, American Cyanamide Co., Stamford, Conn.

Here, Oilgear Fluid Power points the way to better plastics products

Can precision control of power help you in experimental, design or production work?

There apparently is no end to the ways in which versatile Oilgear Fluid Power can help industry turn out better products. In the Stamford, Conn., Research Laboratories of the American Cyanamide Company for example, Oilgear's smooth, infinitely variable and precisely controllable power and speed are helping plastics research fully to investigate and compare the characteristics of various plastics throughout the full pressure range.

One of many desirable press cycles possible with Oilgear Fluid Power is: quick closing of platen a preset distance . . . maintaining a preset pressure for a preset time with low power input . . . quick opening of platen a short preset distance . . . quick closing of platen . . . gradual pressure increase at an adjustable rate with low power input . . . quick opening of platen to loading position.

Whether you want stepless increments of power or speed, or precision control manually or automatically . . . whether you want complex combination of functions or a more conventional solution to rotary or straightline transmission problems, you *should* investigate Oilgear Fluid Power without fail and without delay. Know more about this pliant power so easily molded to your needs. Write today. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee 4, Wisconsin.

Oilgear Fluid Power

ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds? **2.** Obtain automatic work cycles, variable speeds in either direction . . . with or without preset time dwell? **3.** Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities? **4.** Obtain extremely accurate control of either position or speed of a reciprocating member? **5.** Apply accurately variable pressure either static or in motion? **6.** Closely synchronize various motions, operations or functions? **7.** Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel? **8.** Obtain continuous automatic reversing drives at constant R.P.M. or over a wide range of speed variation? **9.** Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration? **10.** Obtain constant horsepower output through all or part of a speed range? **11.** Obtain automatic torque control? **12.** Obtain accurately matched speed of various rotating elements? **13.** Obtain constant speed output from a variable speed input? **14.** Obtain full preset automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!

Assembly Line . . .

ROBERT T. REINHARDT

• Kaiser-Frazer plans will unfold around new plants in Midwest and East for assembly . . . Ford stripper building will enlarge output of steel . . . Dodge, Plymouth show new models.

DETROIT—While the job of completing plant facilities still remains to be done at the Kaiser-Frazer headquarters at Willow Run, front offices are busy planning for further expansion. Quite obviously Messrs. Kaiser and Frazer—about whom there are currently running stories of dispute which may, or may not, be inspired by competitors—have large plans indeed.

Very shortly the company will probably announce that it expects to operate a third assembly plant, probably at St. Louis or maybe at Kansas City. This would be in addition to the Willow Run headquarters and the Los Angeles plant recently announced. Although the prairie area factory is being thought of in terms of production of 50,000 cars a yr, this is hardly the end of the story. Farther back in the Kaiser-Frazer planning is an East Coast plant, a likely location for which might be Bristol, Pa., where the Fleet Wing division of the Kaiser enterprises was situated. Otherwise Baltimore might be a good bet. Still farther back in the files is thinking about a southern location, and as good a guess as any, in the light of other automobile planning, would be Atlanta, Ga., a good distribution center for the more profitable end of the southern business.

Still one more production point is under consideration by Kaiser-Frazer, in Texas. Dallas or Garland could be nominees for this branch plant, thought of as a means of supply for Texas and its environs.

All the way through on this branch plant program the Kaiser-Frazer people are figuring on acquiring erstwhile war plants. Such are available at St. Louis, Kansas City, Bristol, Baltimore, Atlanta, Dallas, Garland and many other locations. The thinking runs that acquisition of these plants at low cost figures, together with the substantial freight savings involved in shipping cars from branch points, would create a new rosy hue to the rainbow which has already been and will continue to be painted by the assiduous K-F publicists.

WHEN it is completed late this year, a new stripper building in the Ford steel mill will have the effect of increasing steel output at the Rouge by a considerable proportion, perhaps 20 pct or so, because of the time savings which will be created in the soaking pits. Better steel quality is also indicated.

Ford has always had a problem in handling its steel, due to inadequate track and stripping facilities. After molds came from the pouring stations, they had to be pulled out into the yards and often were stalled on track for six or eight hr—occasionally more. This obviously increased soaking pit time far beyond normal requirements, and the full load in the pits choked up operations all the way back to the open hearths from time to time.

When the new setup is completed, however, it is figured that no more than 80 min or so will be required on track between pouring and loading into the pits.

Foundations have been installed for a new building located east of the openhearths and west of the press steel heat treat building. One structure will be 800 ft long by 60 to 80 ft wide, with the old mold building, about 140 ft long, utilized for a center section. The project will cost somewhere around $1,500,000.

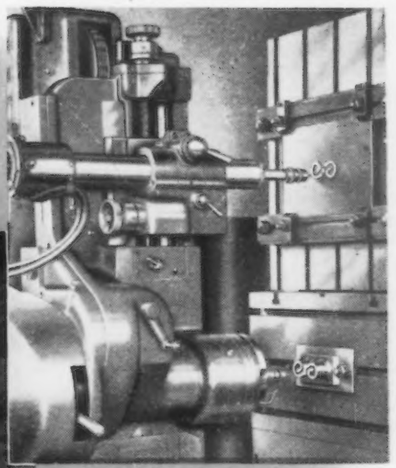
When it is completed molds will move south over standard gage track from the pouring station into the new building, and then return northwards to a hottop shakeout. Continuing northward, the molds will be stripped by a stripper crane and then handled by a tong crane into electric cars. Movement up to this point will be by 50-ton 300-hp diesel engines. A line of electric cars will pick up strings of eight or three ingots, depending on size, will pass a weighing station, and then will convey the ingots to the soaking pits. Another electric car will run at right angles, east and west, along the line of the pits. A standby electric car setup will be located in the western portion of the building. All these electric cars will be controlled from a central pulpit at the juncture of the lines, and will be equipped with a remote control electric uncoupling and coupling device.

After discharging ingots, the mold trains will be returned south to a mold cooling area where a water spray is expected to bring them down within 30 min or so to the 450° temperature required for tar coating.

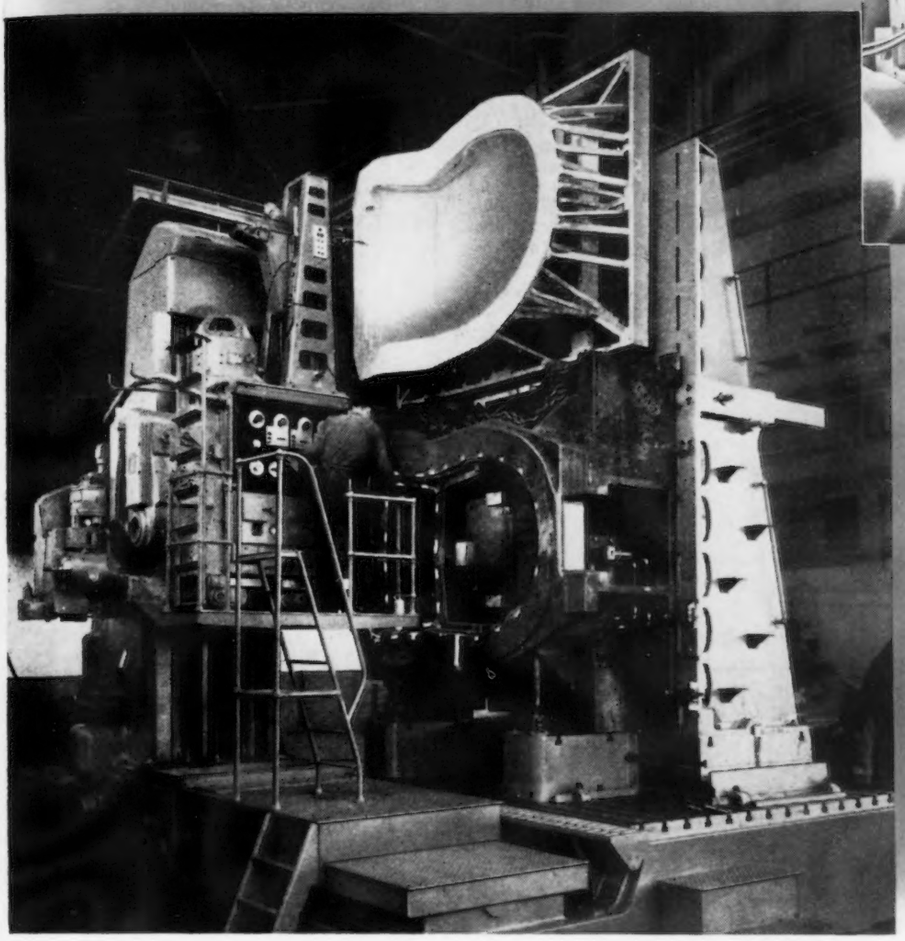
THE last of the new cars of established manufacturers to be shown is the Dodge, which goes on display throughout the country this week. No less than 60 design and engineering improvements are listed by the company for its two lines, a deluxe series of three body styles and a custom line in five models.

An improved engine characterizes the line. Producing 102 hp in its six cylinders, this power plant has been changed in many respects. The engine manifold has been redesigned for improved fuel distribution. Plated aluminum alloy pistons are offered, each with four rings, the top two of which are plated to reduce scuffing and scoring. Exhaust valves are finished

KELLER TRACER-CONTROLLED MILLING



(Above) A Keller GG Machine produces the punch for a small electrical contact spring.



(Left) The Keller BG-3 Machine produces the three-dimensional die for a large auto body part.

Makes Dies and Molds of all Types and Sizes

A small part? Say a little electrical contact spring? The Keller Machine will make both the punch and die to mass produce it, from a model made from wood, plaster or other easily workable pattern material, or from one of the parts themselves.

A big part? Say a section of an automobile body? The sensitive electrically-controlled tracer will feel out the most intricate design in the model and duplicate it in a die, a mold or even a pilot model milled from steel, Duralumin or similar metal.

Yes, and the Keller Machine will produce dies and molds between those two extremes . . . any two- or three-dimensional shape up to $2\frac{1}{2} \times 6 \times 12$ feet.

Reduce tooling costs. Cut experimental costs. Use the Keller process of tracer-controlled milling. There are several machines to cover the range of your requirements. Write today for full information.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT

by a rolling procedure which improves furnace finish of stem, reduces scuffing of stem in guide, and increases valve life.

The fuel system has been revamped and improved. Electrical wiring is wrapped in a permanent plastic coating. Brakes are improved.

The outer appearance has been smartened with a massive new stainless steel grille, headlamps with widened space between, new blended front fenders which extend well back along the front door, fairing into body lines, and new rear fenders. Bumpers curl around the fenders to increase protection.

Earlier, another Chrysler Div., Plymouth, unveiled its models. The line includes a 4-door sedan, 2-door sedan, 5-passenger club coupe and business coupe available in either deluxe or special deluxe types, with a convertible coupe and station wagon in the special deluxe.

Power output of the engine is set at 95 hp, developed in part out of plated aluminum pistons which replace the 1942 iron alloy. The heavier crankshaft developed in 1942 has been retained.

The car includes the new safety hydraulic brake developed in the corporation, common to all the 1946 Chrysler lines. The safety rim wheel is standard equipment on all new Plymouths. A new propeller shaft and universal joints with needle bearings are featured on the cars. Also new are a front end sway eliminator, new differential gears, and many other features. Stainless steel is employed to produce a belt molding which runs the full length of the hood and body. Stainless steel also comes into play in beading used to provide a rustproof seal between rear fenders and the body.

Ford Reopenings

Dearborn, Mich.

• • • The schedule of plant reopening in Ford branches following upon renewed shipments of parts and materials requirements has been announced as follows:

Mar. 11—Rouge plant, Louisville and Buffalo.
Mar. 12—Edgewater, N. J.; Twin City at St. Paul, Minn.; Chester, Pa.
Mar. 13—Somerville, Mass.; Kansas City, Mo.; Memphis, Tenn., and Chicago.
Week of Mar. 18—Dallas, Tex.
Week of Mar. 25—Long Beach, Cal., and Richmond, Cal.

Chrysler Returns Plant

Detroit

• • • Chrysler Corp. has turned over to the Reconstruction Financ Corp., the land, buildings and equipment of the $174 million Dodge Chicago plant which it oprated during the war.

The plant, largest aircraft engine operation in the country, included 6,308,431 sq ft of floor space. At peak production it employed 33,231 persons.

Disposal of the plant is now being attempted by the War Assets Corp. One reported interested party has been Tucker Engineering Co., Ypsilanti, Mich., which hopes to use it to build a new radically designed type of automobile. A Chicago syndicate also has reportedly entered a bid for the entire plant, planning to subdivide it for individual users if its offer is approved.

Chrysler Eliminates Tin from Body Solder

Detroit

• • • The Chrysler Corp. has worked out methods that have permitted it to halve its prewar consumption of tin per car. In 1940 Chrysler used a ton of tin for 480 cars of its several lines; now the same amount will serve for the production of more than a thousand cars.

Body solder, used as a filling material to give a smooth finish and uninterrupted body lines formerly containing 15 pct tin, has been developed by Chrysler to the point where no tin at all is required. The new solder provides all of the flowing characteristics and ease of forming necessary for the job.

The soldering of fittings to gasoline tanks has been replaced by spotwelding, using a plastic gasket where a seal is needed. In certain places where the use of tin solder for sealing is still required, the content of tin has been reduced from as high as 40 pct down to 10 pct.

Prior to the war, aluminum pistons were coated with tin to lubricate them properly so that they would withstand the severe scrubbing action against the cylinder walls. A new brass coating has been developed which works equally well, again saving tin.

Surplus Sales Mounting

London

• • • Sales of British government-owned war surplus stocks up to the end of 1945 amounted to approximately 35¾ million pounds ($263,000,000), according to statistics of the Board of Trade. Included in the total are:

Consumer goods, including cloth	$38,000,000
Plant, machinery, aircraft (sold for commercial use) motor vehicles, boats	27,000,000
Machine tools	22,000,000
Other goods for industry, including scrap	56,000,000

SMART STYLING: *Front fenders which blend into the body of the new Dodge, a massive new grille of stainless steel, more widely spaced head lamps and distinctive identification characterize the effective styling of the new Dodge, shown here in the deluxe 4-door sedan model. The entire line offers eight body styles.*

How To Eliminate Production Operations with Carpenter Alloy Steels

----------FOR LOWER COSTS ALL ALONG THE LINE----------

In your search for *lower manufacturing costs,* look into the cost-saving possibilities of cutting down the operations you perform on alloy steel parts.

For example, in buying an SAE Steel it pays to do more than check the analysis. Look into its "character", its adaptability to the job you have cut out for it. First check for the right combination of physical properties . . . hardness—toughness—wear resistance . . . whatever you need for the job. Then find out how the steel can help you cut unit costs.

And here's the way to do it . . . right now.

Use a Carpenter Special Purpose Alloy Steel that is manufactured and inspected to tool steel standards. One manufacturer *reduced machining time and cut unit costs* 78% on one part . . . merely by using a Carpenter Special Purpose Alloy Steel that was tailored to *fit the job.* You can get similar results, by calling on Carpenter for help with your alloy steel problems.

Carpenter knows how to furnish alloy steels with a finish, or heat treatment, or close tolerance that is a step nearer to your finished product requirements. We can guarantee uniformity from lot to lot, to insure dependable product performance, reduce rejects, save production time and cut your unit costs. If you are interested in the cost-saving advantages of Carpenter Special Purpose Alloy Steels, just drop us a line. We will be glad to send you a copy of the new booklet, "Fitting the Steel to the Job." It contains more detailed information on what custom-made alloy steels can do for you.

Carpenter

SPECIAL PURPOSE

ALLOY STEELS

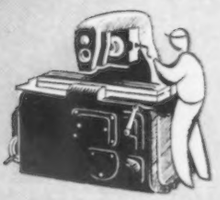
. . . made in a tool steel mill
. . . inspected by tool steel standards

THE CARPENTER STEEL COMPANY • 121 W. BERN STREET, READING, PA.

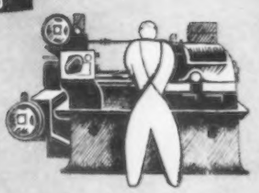
FIND NEW WAYS TO REDUCE YOUR COSTS ON THESE OPERATIONS!

ROUGH MACHINING

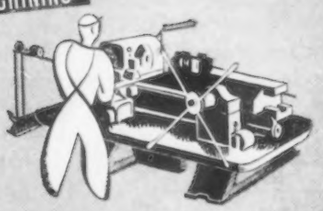
MILLING



THREADING



FINISH MACHINING



HEAT TREATMENT

FINAL GRINDING AND LAPPING

INSPECTION

Washington . . .

L. W. MOFFETT

• Premiums for nonferrous metals likely will be continued for additional year . . . Aggregate $1.645 billion plus in 3 yr-5 month period.

WASHINGTON — Continuation of the premium price plan for copper, lead and zinc on a non-cancellable basis for another year beyond its present expiration date of June 30, 1946 seems inevitable. Bills have been introduced in both Houses of Congress extending the plan (THE IRON AGE, Feb. 14, p. 125), and OPA has requested its continuance for another fiscal year. The extension has the backing of the powerful Western bloc of legislators and the Senate Small Business Committee, as well as CPA, OPA and other government agencies. In addition, proposals have been made from various sources, including the International Union of Mine, Mill & Smelter Workers, CIO, for a permanent subsidy plan.

Instead of seeing a decline in requests for more and more subsidies, since the war's end the trend has been reversed. Subsidies paid on copper, lead and zinc for the fiscal year ending June 30, 1946, will aggregate $88 million. Now the Administration, through James F. Brownlee, deputy to Stabilization Director Chester Bowles, has asked the House Banking Committee for $199 million for subsidies on copper, lead and zinc. The total asked for subsidies for the fiscal year 1947 reaches the astronomical sum of $2051 million. Thinly disguised as an effort to hold down the cost of living these subsidies would cover metals, foods, rubber, petroleum, dairy products and crop and non-crop payments.

A scanning of both present and past operations of the plan reveal a unique experiment in governmental stimulation of a segment of the national economy. Obviously, its original intent was to achieve maximum production by making it profitable for so-called marginal producers, as well as others, to get every ounce possible out of the ground.

At present, approximately 25 pct of domestic copper output, 62 pct of zinc and 60 pct of lead is produced under the premium price plan.

Premiums now being paid are as follows:

(1) Copper—Initial premium is 5¢ per lb. There is also a special premium up to another 10¢ making the total allowable premium 15¢ per lb. Added to the copper ceiling of 12¢ per lb, the maximum permissible price is 27¢ per lb.

(2) Zinc—There are three premiums, of 2.75¢ per lb each assigned to A, B and C quotas. With a ceiling price of 8.25¢ per lb addition of the premiums results in the following prices for the individual quotas: A quota, 11¢ per lb (8.25¢ plus 2.75¢); B quota, 13.75¢ (8.25¢ plus 2 x 2.75¢); and C quota 16.50¢ per lb (8.25¢ plus 3 x 2.75¢).

(3) Lead—Two premiums of 2.75¢ per lb each assigned to A and B quotas. The present ceiling is 6.50¢ per lb making the price on A quota production 9.25¢ per lb (6.50¢ plus 2.75¢), and on B quota production 12¢ per lb (6.50¢ plus 2 x 2.75¢).

Approximately 22 pct of over-ceiling copper production is at the 17¢ price, while the special premium accounts for only slightly more than 3 pct. About 36 pct of over-ceiling zinc production is at the 11¢ price, 16 pct at the 13.75¢ price, and 10 pct at the 16.50¢ price. In lead about 43 pct of over-ceiling production is at the 9.25¢ price, while the 12¢ price accounts for only slightly more than 15 pct.

The disparity between actual cost of production and ceiling prices is clearly evident. While there is considerable resistance on the part of the government to raising the ceilings there is no doubt that production costs are increasing, and higher prices are inevitable, whether it be through raising of the ceiling prices or increases in premium payments. S. 1815 would raise ceilings through legislation in addition to extending the premium price plan. Labor, equipment and materials costs all reveal an upward trend.

Of course, an increase in the ceiling prices would reduce the subsidy cost to the government, but it is recognized that it would not entirely do away with the necessity for subsidies for marginal producers. In fact, there is a striking parallel between this situation as it affects small mining operations and that which con-

This table prepared by the Mining and Minerals Subcommittee of the Senate Small Business Committee reveals the latest figures available on the operation of the premium price plan:

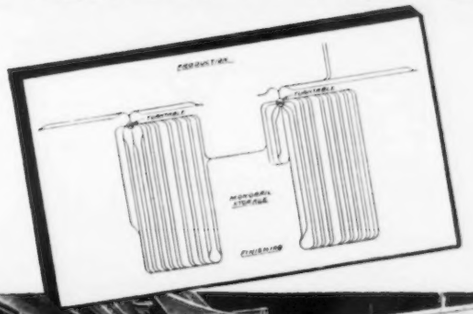
Copper lead, and zinc production, premium payments, and costs, Feb. 1, 1942 to June 30, 1945 inclusive.

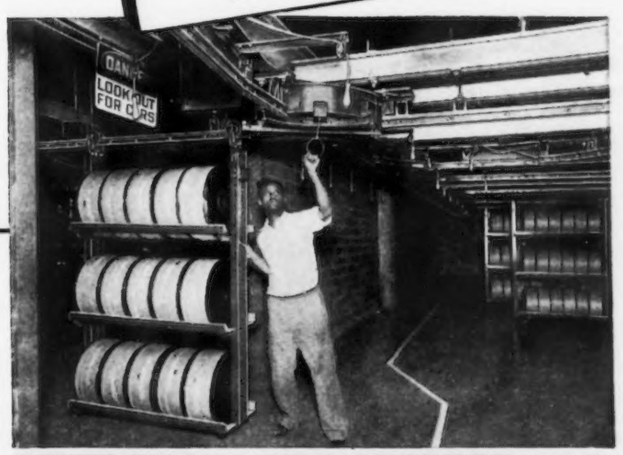
	Copper	Lead	Zinc	Total
Total domestic primary (new) metal production (in tons)	3,460,637	1,500,804	2,473,971	
Premium payments (made by MRC)[1]	$73,633,000	$36,843,000	$100,809,000	$211,285,000
Cost to purchaser at market (ceiling) prices	830,553,000	195,105,000	408,204,000	1,433,862,000
Total cost (ceiling prices plus premium payments)	904,186,000	231,948,000	509,013,000	1,645,147,000
Average price[2] per lb of primary metal produced during the period Feb. 1, 1945–June 30, 1945	13.06¢	7.73¢	10.29¢	
Ceiling prices	12.0¢	6.50¢	8.25¢	
Average price per lb of primary metal produced during the month of June 1945 only[3]	13.75¢	8.73¢	11.14¢	

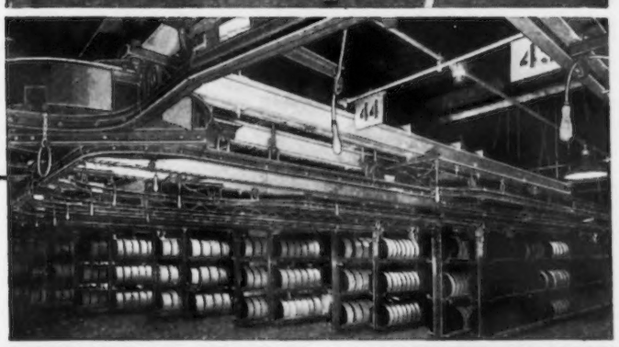
(1) Does not include smelter subsidies or MRC mine contract purchases.
(2) This average price is derived from the total metal cost (ceiling prices plus premium payments) and total domestic primary metal production for the period shown.
(3) The average prices during June 1945 show the trend toward increased production costs. This data, secured from OPA reports, is based upon ceiling prices plus total over ceiling payments (including premium payments, smelter subsidies, and MRC mine contract purchases).

FLEXIBILITY

of AMERICAN MONORAIL EQUIPMENT Solves Difficult Handling Problems





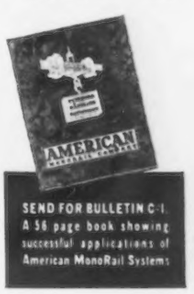


Here is another of the hundreds upon hundreds of handling problems efficiently and economically solved by American MonoRail Overhead Handling Equipment.

THE PROBLEM: To eliminate manual handling of reels from production machines to storage, from storage to finishing, from finishing to storage or shipping as required.

THE ANSWER: The FLEXIBILITY of American MonoRail switching arrangements permits reels to move on carriers with no rehandling between processes. Ample live storage is allowed, permitting free movement between all processes.

What is your handling problem? American MonoRail Engineers come up with the answer to efficient and economical handling ninety-nine times out of a hundred. We invite your inquiries.



SEND FOR BULLETIN C-1.
A 36 page book showing successful applications of American MonoRail Systems

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVE. ● CLEVELAND 7, OHIO

fronted the nonintegrated producers in the steel industry.

In addition, the longer the government waits before adjusting ceilings upward, the wider the gap between actual costs and the present fictitious ceilings will become, thereby resulting in reluctance on the part of OPA to ever lift ceilings, because of the terrific adjustment that would be required throughout the industry.

During the life of the plan premium payments had been made to some 3100 mines through June 1945. The greatest number of mines, both large and small, operating under the plan at any one time was approximately 1700.

Up to May 1, 1945, 3565 copper, lead and zinc mines were assigned quotas under the plan. Of this number, the RFC Office of Metals Reserve reports that 3092 mines had received premium payments since the inception of the program. The remainder of 473 mines for various reasons made no shipments after receiving quotas, some presumably due to the receipt of inadequate premium assistance.

Only 1296 mines have made shipments and received premium payments since May 31, 1945. This indicates that 1796 (58 pct of 3092) small mines, opened and operated under the stimulus of the premium price plan, have been forced to close.

The Small Business Committee, on the basis of a study made by the Office of Metals Reserve, reports that 1353, or 75 pct, of the inactive mines received no more than A-zero quotas, which are granted to all new operations upon request, and that only 51, approximately 3 pct, of the total had been assigned the full amount of the allowable B and C lead and zinc quotas. The Committee also reports that it is disturbing to note that of some 216 mines which received B and C quotas, approximately 165, or 76 pct, failed to receive the maximum allowable quotas for which they were definitely eligible.

Several hundred of 1353 small, inactive mines which received A-zero quotas only, probably were ineligible to receive B and C quotas or special copper premiums, having failed to qualify before the cut-off dates announced by WPB during the latter part of 1943, and some closed before the additional premiums became available. However, hundreds of others, if not the majority, probably found it impossible to present the comprehensive and exacting data demanded by the Quota Committee during the first 12 months or so following the inception (early 1943) of B and C lead and zinc quotas and special copper premiums and therefore failed to receive additional assistance.

WHILE it is generally conceded that the Quota Committee has done an excellent job of administering the plan with a small staff, the Committee is open to criticism for what might be termed high-handed methods in several instances. This Committee, composed of representatives of RFC and the War and Navy Depts., assigns quotas to mines on the basis of individual operations, taking into consideration historical background, cost of production, forecasts of future production and many other factors.

The Senate Small Business Committee in its latest report has the following to say:

"The 'principal rules and regulations' of the premium price plan for copper, lead and zinc (14 in number) were publicly announced Feb. 9, 1942. Subsequently, the Quota Committee from time to time has formulated and applied numerous restrictive rules and regulations, which have never been officially announced, for the protection and guidance of producers.

"Sixteen of these unannounced rules and regulations currently in effect were brought to the attention of the mining industry for the first time by this Subcommittee in a press release dated July 23, 1945.

"Having no means of knowing the many unannounced rules, regulations, and policies applied and modified from time to time by the Quota Committee and the administering agencies, many mine operators suffered severe hardships—including financial losses and reductions in allowable operating margins.

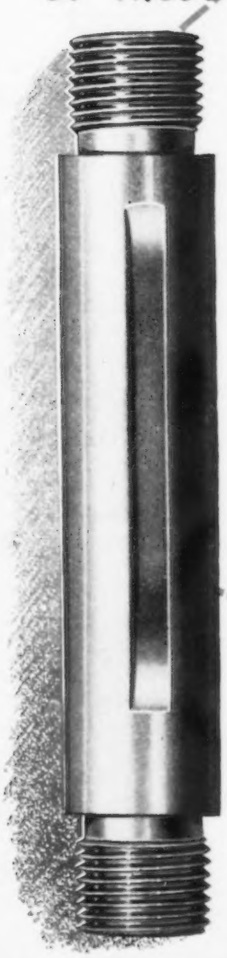
"The failure of the Quota Committee to apprise producers of their rights and privileges under the premium-price plan, and the changes made in the expressed and implied terms of the plan (through the application of numerous reservations and qualifications) subsequent to the announcement and public acceptance of such terms, appears to be wholly indefensible."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

NO IT AIN'T! NO IT AIN'T!
YES IT IS! YES IT IS!
THAT'S NO ARGYMENT-- THEY'RE JUST TRYIN' TO SEE HOW MANY WILL TRY TO TAKE SIDES WHEN THERE AIN'T ANY!
THEY GOT ME ON THAT ONCE-- I WAS TAKIN' SIDES WITH TH' ONE HOLLERIN' NO-- THEN THEY CHANGED!
A&D
3-15
J.R.WILLIAMS
THE SHOP JOKERS
COPR. 1946 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

with **SHEFFIELD**
Semiautomatic Crushing

290
of these



GROUND ACCURATELY WITH ONE WHEEL DRESSING

Sheffield's semiautomatic crushing device with motorized feed brings ne. advantages to the use of crush dressing.

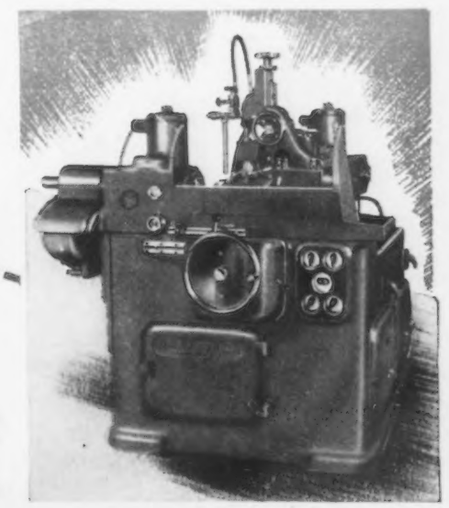
The human element of irregular rate of feeding crusher into the wheel is eliminated. Each dressing operation is uniform.

Crushing is semiautomatic and is done in half the time of manual crushing.

The life of both crusher rolls and grinding wheels is substantially increased because of uniform rate of infeed and pressure.

A typical case history of the advantages of the motorized crusher is illustrated at the left—290 thread elements were plunge ground between wheel dressings on these stainless steel ordnance parts. Threads are 5/8"-18 N.F. 3 having a length of .563". Grinding time, 20 seconds per thread element. Plunge grinding was performed on a Sheffield Thread and Form Grinder.

Write for Bulletin M-100-145.



CHEK WITH SHEFFIELD

Headquarters for crush dressing thread and form grinding equipment

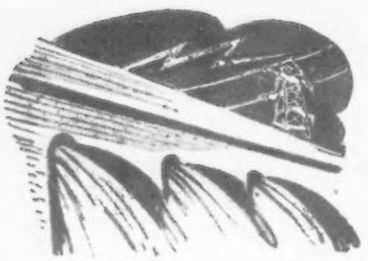
THE SHEFFIELD CORPORATION
Dayton 4, Ohio, U.S.A.
MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES

SHEFFIELD MASTER CRAFTSMAN

West Coast . . .

STANLEY H. BRAMS

• Northwest industries rapidly recovering from postwar slump in spite of materials and skilled labor shortages . . . Mead and Trentwood plants gone over by Kaiser technicians.



SEATTLE—Whoever it was that coined the motto for the State of Washington was certainly no visionary. For some obscure reason "Al-ki," which, when liberally translated means "Bye and Bye," was at one time thought appropriate for a commonwealth which has anything but a casual or indolent attitude.

Business leaders, industrialists and the barber on the third chair in one of Seattle's larger hotels are all in agreement that their state is on the threshold of a new industrial era. The only differences of opinion are in degree and not in direction. Many of the more experienced industrialists are of the opinion that development and growth must come naturally and follow the fundamental laws of supply and demand, but a few business leaders apparently belong to the school of thought that almost anything that carries with it the odor of industrial smoke and increased payrolls is worth trying.

Since Apr. 1, 1940, the population of the state has increased almost 500,000 persons, according to George P. Sheridan, executive secretary of the state development board, with the present total estimated at 2,177,641. Numerically this is not a large increase when compared to the impact of war swollen populations on other Pacific Coast areas. However, the ratio of increase is large and has created many economic and social problems. While the end of the war reduced payrolls materially in such plants as Boeing Aircraft Co., Seattle (from 40,000 to 8000); Pacific Car & Foundry Co., Renton (2500 to 1400); and the DPC aluminum plants near Spokane (2500 to 200); the increased activity in normal production by the hundreds of typical small industries has provided a healthy cushion against serious unemployment problems. Many industries are finding experienced labor exceedingly scarce. A typical example is the Northwest Steel Rolling Mills which is anxious to put on a second turn but hasn't been able to do so because of the labor shortage. There are plenty of welders and other war-industry trained men, but some of the older crafts are sadly in need of new blood.

Until the shortage of trained and skilled men is relieved, production in Northwestern steel mills and other heavy industries will lag. Several employers pointed out that the lack of skilled men has not been fully appreciated because the scarcity of essential materials has served to obscure that phase of their difficulties. Employers are, of course, concerned with the placement of the unskilled, or too-common-skilled labor which abounds. It is from these ranks that the needed skills must be developed.

That this area is taking its industrialization hopes seriously was indicated last week when almost 100 businessmen attended a meeting called by the Seattle Chamber of Commerce industrial department to hear Dr. J. R. Mahoney, Director of the Bureau of Economics and Business Research for the University of Utah. Dr. Mahoney is stumping the West Coast to maintain and develop interest in the continued operation of the Geneva steel plant. Taking the opportunity which the advancement of bid openings to May 1 provides, this spokesman for the Geneva cause will address similar groups in the West.

That Seattle steel users are aware of the potential importance to them of successful Geneva operation was evidenced by the fact that many came from neighboring cities, gave complete attention to the speaker and asked numerous questions. As might be expected, the most frequent question concerned the possibility of Geneva supplying steel to this area at costs lower than now prevailing. Explaining that this would depend upon the operator of the plant and establishment of more favorable freight rates, Dr. Mahoney refused to get out on the limb too far.

Unconfirmed reports continue to circulate in this area that U. S. Steel, CFI and the Kaiser interests are all entering bids for the plant. Eastern sources report that the delay in the date of bid opening was granted by the WAC at request of both the corporation and CFI.

While businessmen maintain that a true boom is being delayed by materials and labor shortages, several projects are developing which might well be the smoke of a first class fire.

Ford Motor Co. started pile driving last week for what will be a $1 million parts depot. With due ceremony witnessed by W. C. Patterson, Northwest branch manager for Ford; C. E. Denney, president of the Northern Pacific Railway Co.; Robert S. MacFarlane, president of the Seattle Chamber of Commerce; Alfred Rochester, representing the city council; and James E. Louttit, manager, industrial department, Seattle Chamber of Commerce; cedar piles capped with 12 gage steel shells 12 ft long were started. The building will be brick, concrete and steel and will be 345 ft long by 200 ft wide. It is scheduled for completion in October.

A. M. Castle & Co. has just opened its new warehouse. Its 62,000 sq ft of floor space would look much better with the addition of several hundred tons of some of the scarcer products according to John B. Robbins, vice-president and general manager.

Boeing, Isaacson Iron Works, Pacific Car & Foundry and Bellingham Iron Works are a few of the industrials which have either actu-

Life lines

Down forty fathoms, in the uncertain half-world beneath the sea, existence itself depends on the life-giving lines that link him with the world above.

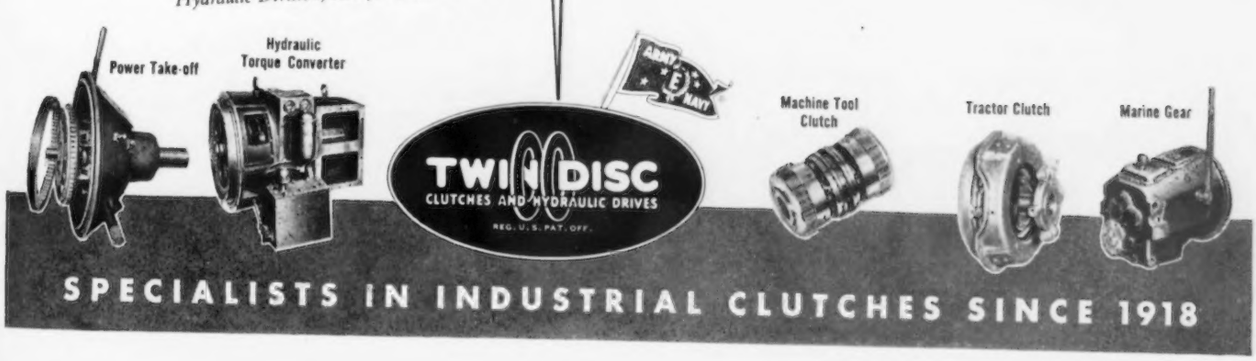
In Industry, too, there are "life lines" equally essential . . . the vital clutches and hydraulic drives that transmit and control the power required to meet today's production demands.

Finding ever more efficient methods of harnessing this vital power . . . tackling and solving new problems of power linkage . . . has been Twin Disc's sole specialty for 27 years.

Results of these long years of experiment and experience are represented today in the diversified line of Twin Disc Clutches and Hydraulic Drives . . . and in the vast backlog of "know-how" gathered by Twin Disc Engineers in designing, building and applying *proved power links* for nearly every industrial application.

Impartial recommendations of the Twin Disc Engineers for solving your particular linkage problem, plus full facts on the extensive Twin Disc line, are yours without obligation. Write today.

TWIN DISC CLUTCH CO., Racine, Wisconsin
Hydraulic Division, Rockford, Illinois



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

ally started postwar developments or will have them under way within a few months.

SPOKANE—Hotels, cabbies, RFC engineers, the Chamber of Commerce, businessmen and prospective employees were given a lift last week when nine members of the Henry J. Kaiser interests descended en masse on this community to inspect the Mead and Trentwood aluminum plants.

Although there was no local confirmation that the leases on the two plants had been signed, Mr. Kaiser's representatives conferred at considerable length with D. M. Baird, RFC Regional Engineer; Chamber of Commerce officials; and plant maintenance men; and established Charles Hively, former employee at the Mead plant, in a local hotel for the purpose of determining how many former employees at both plants would be available on reopening. According to Mr. Hively the response to the publicity on the prospective reopening has brought in hundreds of inquiries.

Henry J. Kaiser is expected to visit the plants within the next two weeks and reportedly will announce date of opening, operating plans and personnel at that time.

Members of the inspection party were: E. E. Trefethen, Jr., president of Kaiser Cargo, Inc.; Donald Browne, administrative manager for several Kaiser companies' operations; D. A. Rhoades, project manager for the Permanente Metals Corp. which is the Kaiser magnesium plant; George Vreeland, consulting engineer for Kaiser Engineers, Inc.; George B. Scheer, chief consulting electrical engineer for Kaiser Engineers, Inc.; Arthur C. Kurzwell, chief consulting mechanical engineer for K. E. Inc.; Tom Ready, Jr., assistant to E. E. Trefethen, Jr.; L. C. Haffner, consulting engineer of Kaiser Co., Inc. at Vancouver, Wash.; and Vance W. Fawcett, publications director for the Kaiser interests.

Both the Mead reduction plant and the Trentwood rolling mill are completely shut down with the General Machinery Co. handling maintenance and a strong force of police on duty to protect the millions of dollars worth of silver bus bars still in place.

LOS ANGELES — Far Western manufacturers of iron and steel products have three predominant handicaps in reconversion, according to Kenneth T. Norris, president of Norris Stamping & Mfg. Co. and president of the California Manufacturers' Assn., when he appeared here last week before a hearing of the U. S. Senate Committee on Problems of Small American Business.

"Eastern producers of sheets are allocating their production to prewar consumers, leaving westerners who are in the market for steel sheet for the first time without a source of material," he declared.

"A second handicap is the policy of steel producing companies in charging 'phantom freight' to Western buyers on steel produced in the West. This policy results in Western buyers paying from $10 to $25 a ton more than their eastern competitors." Mr. Norris again advocated that the government require that any purchaser of the Geneva, Utah, plant must establish a price for his product independent of eastern basing points, to break the "phantom freight" policy.

Finally, he pointed out that President Truman's recent order permitting steel mills to increase prices on raw and finished steel results in increased cost of material to fabricators such as himself who as yet are promised no relief from OPA price ceilings and are expected to absorb the cost. "This can only result in stopping production of badly needed goods," he stated.

DRIVING HARD: *W. C. Patterson, C. E. Denney and Robert S. MacFarlane, from left to right, officiate at ground-breaking for the new Ford Motor Co.'s parts depot on the West Coast. A special pile-driver forces steel piling through Duwamish River fill down into firm foundation.*

o o o

Sets Up Display Center

Washington

• • • A purchase Information Section has been established under the Procurement Div., Army Service Forces, Room 3 C 467, the Pentagon, to display to prospective bidders and interested public, invitations for and abstracts of bids issued by Army Contracting officers for Army equipment, supplies and construction.

Recently established policy of the War Dept. provides that whenever practicable, procurement shall be by formal advertising and competitive bidding. Authority to negotiate contracts still exists under provisions of First War Powers Act and Executive Order 9001, but it is to be exercised only when it is determined that formal advertising procedures will not produce results as favorable as negotiation.

o o o

HYDRAULIC BALANCE

CANCELS OUT BEARING LOADS

And Means MUCH LONGER PUMP LIFE

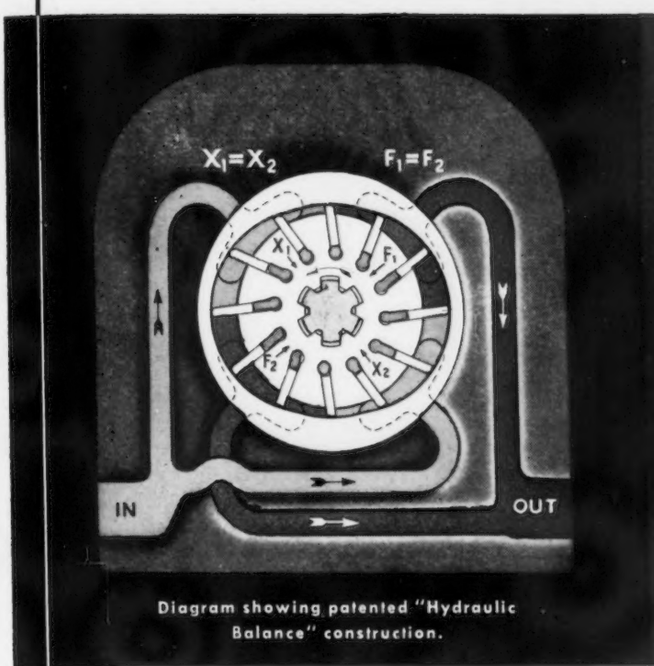


Diagram showing patented "Hydraulic Balance" construction.

VICKERS
Balanced
VANE TYPE
PUMPS

As illustrated by the diagram above, equal and opposing pressure areas are provided on the outlet side and on the inlet side of Vickers Balanced Vane Type Pumps. The equal and opposing radial hydraulic thrust loads cancel each other . . . consequently there are *no* bearing loads resulting from pressure. The major cause for wear is thus completely eliminated and the result is much longer pump life. This "Hydraulic Balance" construction is exclusive with Vickers Vane Type Pumps; it also permits an unusual design compactness and is an important reason for the exceptionally high efficiency of these pumps.

Vickers Balanced Vane Type Pumps are available in single-stage for 1000 psi (see Bulletin 40-25a); two-stage for 2000 psi (see Bulletin 40-16) and also two-pressure, large-small volume (see Bulletin 38-14). Vickers Application Engineers will gladly discuss with you the many different types of hydraulic power and control circuits on which these pumps have improved machine performance. Write the office nearest you.

VICKERS *Incorporated* • 1420 OAKMAN BLVD. • DETROIT 32, MICHIGAN

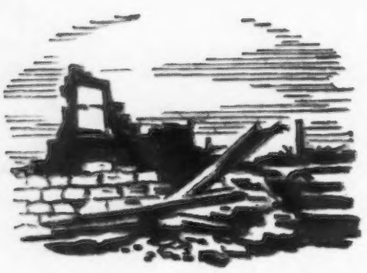
Application Engineering Offices: CHICAGO · CLEVELAND · DETROIT · LOS ANGELES · NEWARK · PHILADELPHIA · ROCHESTER · ROCKFORD · TULSA · WORCESTER

Representative of More than 5,000 Standardized Vickers Units for Every Hydraulic Power and Control Function

CONSTANT DELIVERY PUMPS | FLUID MOTORS | DIRECTIONAL CONTROLS | VOLUME CONTROLS | PRESSURE CONTROLS | CONTROL ASSEMBLIES | VARIABLE DELIVERY PUMPS

European Letter . . . JACK R. HIGHT

• Steel subsidy to take place of price increase in France . . . Production in next three months key to future of coke subsidy . . . Scrap sales freed.



PARIS—Trade estimates of steel consumption in France for 1946 foresee more than half of the total output being used for maintenance and repair work in existing plants. The allocation of steel for different uses is on the basis of an estimated production of 2,400,000 metric tons for the year, compared with an output of 5,800,000 metric tons in 1938.

If the production reaches the predicted rate, 1,300,000 tons will be allocated to maintenance and repair work, 400,000 tons for actual manufacture of new goods, and 700,000 metric tons for machinery to re-equip and modernize factories. These plans compare with a consumption in 1938 of 1,600,000 tons for maintenance; 1,000,000 tons for manufacture; and 3,200,000 tons for machinery.

Under the allocations for 1946, if production goals are met the electrical industry will receive 250,000 metric tons, transport will get 700,000 metric tons, and the structural steel industry 550,000 metric tons. These allocations make up 63 pct of the total anticipated production. Other industrial lines will get no more than 900,000 metric tons of the year's steel production.

Although the fuel and transport difficulties continue to limit production in French mills, output in January represents a slight increase over the previous month in pig iron and finished products, but a small decrease for steel production. The approximate figures for the month are 192,000 metric tons of pig iron, 228,000 metric tons of steel, and 174,000 metric tons of finished products.

Compared to the average monthly production for 1938, the January pig iron production is about 38 pct of the prewar figure. Ingot steel output approximates 45 pct of the earlier period, and finished steel production has reached about 55 pct of the prewar average month.

Reflecting these low output figures are the total imports of iron and steel products for the last two months of 1945. Importing 98,000 metric tons in November and 87,000 in December, despite a shortage of steel in the world market and a dearth of foreign exchange, France has reversed its position as a prewar exporter of steel products. Imports of steel did not average above 6000 metric tons per month in 1938, while in prewar years France was exporting 20 to 25 pct of its steel production.

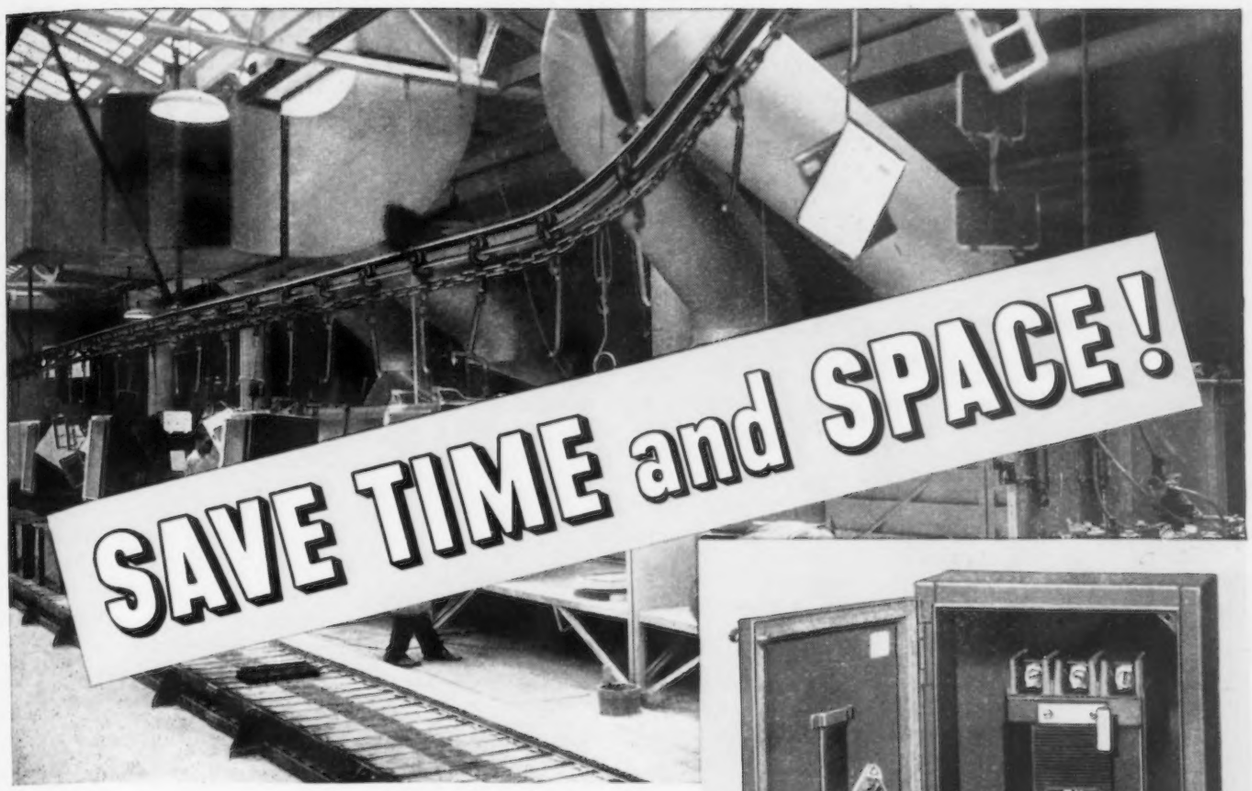
French steel officials attribute the low steel production rate directly to the fuel shortage, and the current imports of metallurgical coke, upon which the French industry has historically depended, tend to bear out this opinion.

Latest statistics available for coke imports covering December 1945, show that 80,000 metric tons were delivered to France in that month, and 63,000 metric tons were delivered in November. These totals started from an import total in June of 1945 of only 9000 metric tons.

IMPORTATIONS from the Saar (3000 metric tons) and from the Ruhr (38,000 metric tons) were also at their maximum for the year. Importations from Belgium to France were raised to 26,000 metric tons, while those from the United Kingdom dropped from 15,000 in November to 8000 in December.

The gradual increase in iron and

BRITISH CAR EXPORTS: *Great Britain has set a goal of 1000 cars per week this year for export. According to Lord Nuffield many of the cars would be available to South Africa, Australia and other empire buyers. Here are cars at the Morris Motor Car Co. at Cowley, Oxford, ready for shipment abroad.*

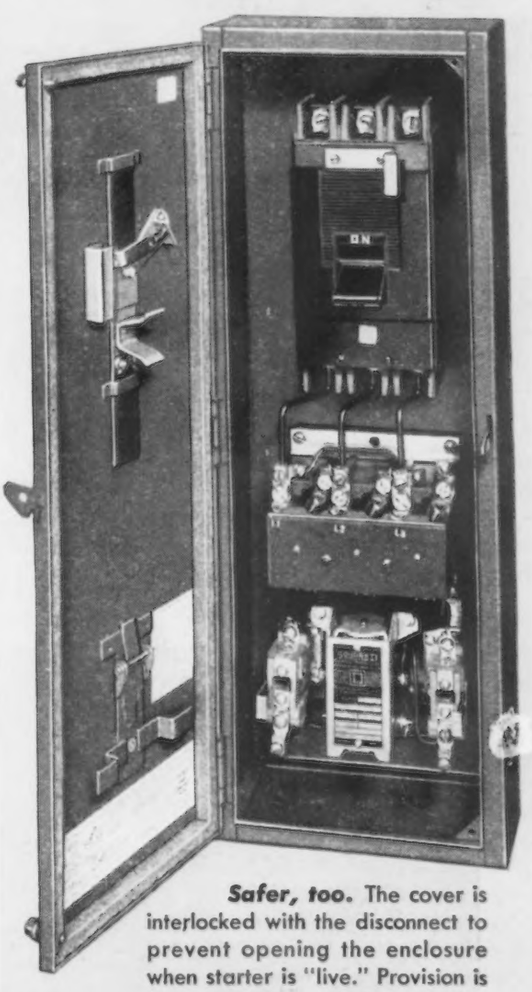


Square D Front-operated Combination Starters

● You save time by using combination starters. Since the disconnect (switch or breaker) and the magnetic starter are housed in one enclosure, you cut mounting time in half and also save wiring time.

A combination starter takes less space than two separate devices. These Square D front-operated units save still more space. They are especially suitable for "ganging."

Square D front-operated starters are available in three capacities—sizes 0, I, and II. Some types of larger sizes are side-operated. For informative bulletin, address Square D Company, Industrial Controller Division, 4041 North Richards St., Milwaukee 12, Wis.



Safer, too. The cover is interlocked with the disconnect to prevent opening the enclosure when starter is "live." Provision is also made for padlocking the disconnect in the "OFF" position.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

steel production in France has brought up the need for the development of some form of price relief for the basic steel industry, besought with the problems common to all the world's producers after the war, plus some unique ones.

The immediate French solution takes the form of a subsidy for producers, rather than as a direct price increase. The same policy is being followed by the provisional government, with a similar form of subsidy being used in both the coal and food industries. The budget for 1946 for the country for all of these subsidies amounts to about 117 billion francs (slightly less than $1 billion).

Industry's reaction here to the subsidy plan is not a favorable one. The industrialists note that there is a trend away from the subsidy plans in use in Britain throughout the war and they are being withdrawn as much as possible. By the month of March the only subsidies remaining in the United Kingdom will be one affecting the price of pig iron in its relation to scrap prices, and a plan relieving industry of some of the freight costs of imported iron ore.

In the debate which took place in the Constituent Assembly last month M. Andre Phillip, Minister of Finance, traced the outline of the government's future policy in regard to the subject of subsidies in general. He declared that it was the policy to drop subsidies where ever and as soon as possible, such as those for zinc, lead, antimony, and the one on coal which will cost the French taxpayers 45 billion francs ($375 millions approx.) per year.

The use of the subsidy on coal has the effect of holding the official price of coal down from an estimated 1200 francs ($10.08) to a price of 600 francs ($5.04). One unfortunate result is that industry is not sufficiently encouraged to recognize the fuel crisis by using wherever possible other fuels, such as peat, because their net cost exceeds the subsidized selling price of the coal.

STRANGELY familiar to American ears is M. Phillip's statement that present profit margins of many producers will permit them to absorb the increase in the price of coal when the subsidy no longer exists. Present immediate plans call for subsidies to be maintained only on gas and electricity destined for domestic use, and on coal to be used by the steel industry. To maintain the subsidy on gas and electricity will cost approximately 6 billion francs ($50,000,000).

It seems increasingly evident that the government should maintain the coal subsidy for a period of three months. After that time it is hoped that the production of steel will increase sufficiently that the abandonment of the coal subsidy will not necessitate a steel price increase.

Steel circles note that the abandonment, when it comes, of the coke subsidy, will increase the price of blast furnace coke from 760 francs to 1400 francs per ton. ($6.38 to $11.70). Such an increase would advance the cost of No. 3 phosphorus pig iron from 2350 to 3000 francs ($19.76 to $25.21) if the market price did not exceed the actual cost. The final decision as to the future of the metallurgical coke subsidy will probably be the subject of much government debate here in the coming weeks, but will depend largely on what steel production rate is established in the next three months.

Reflecting the abundance of scrap available in France the Ministry of Industrial Production has lifted the controls on scrap marketing which were imposed on Sept. 5, 1941. The new instructions free both consumers and producers to deal directly or through any merchants. The sale of certain types of alloy steels has also been freed, as they are becoming more generally available.

NO NOT NYLONS: *These three girl "runners" raced in to stake a claim on machine tools for their firm at a recent* $6,000,000 *bargain sale of government machine tools in Glasglow, Scotland.*

Britain Lifts Controls From Some Industries

London

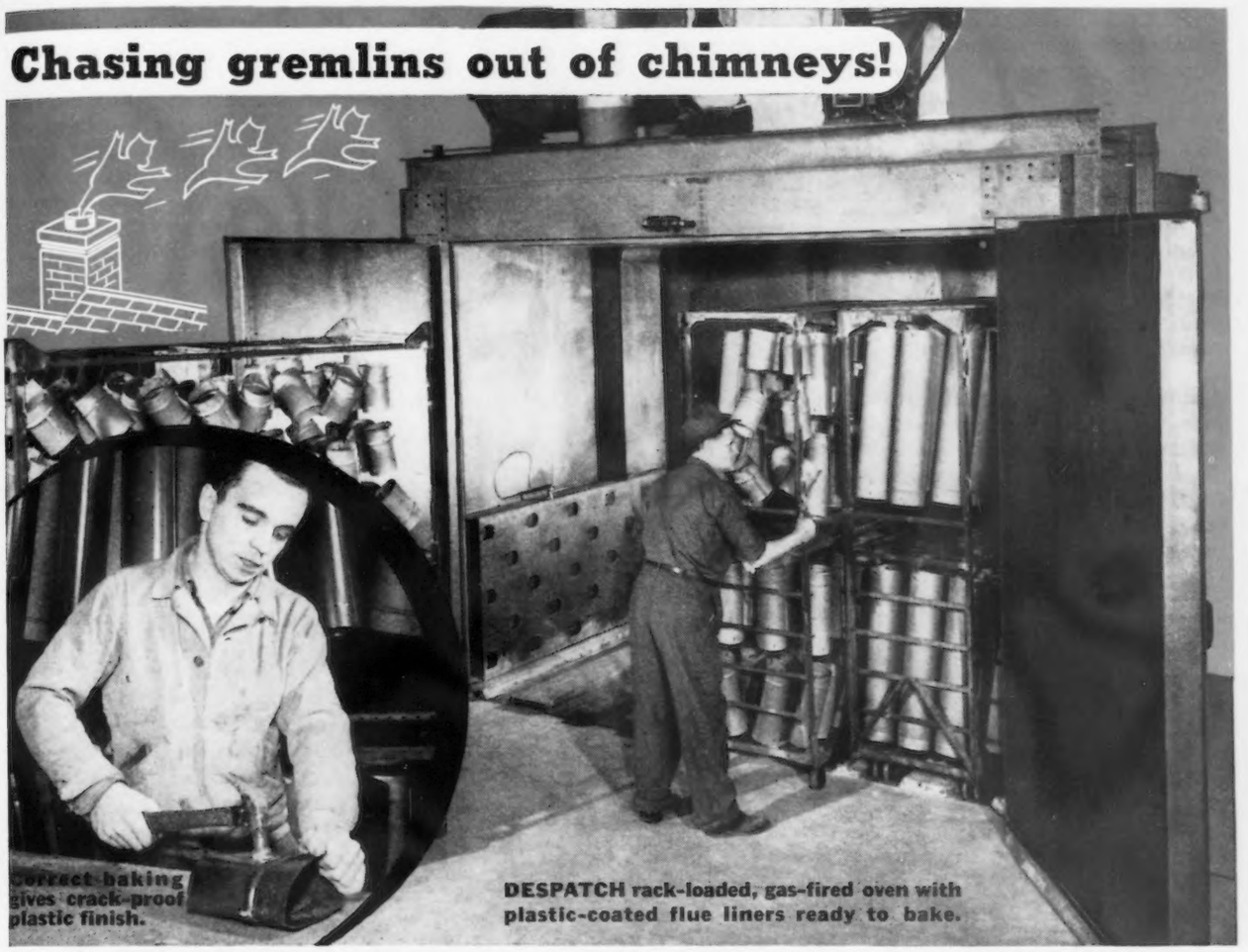
• • • **According to notices** from the Ministry of Labor, controls on about 100 additional types of business are to be withdrawn in three months. It is officially estimated that at that time the total workers to have been released from controls will total approximately 5,000,000.

Among the industries to be decontrolled are the following:

Abrasives, aluminum smelting, chain production, coke ovens, constructional engineering, electrical cables, iron and steel production (excepting iron foundries, iron and steel tubes, pipes and fittings, sheets and tinplate) iron and steel warehouses, lead production, light alloys (wrought and foundry) magnesium, nonferrous metals production, sheetmetal work.

Primary industries destined to remain under control for the present are mining, building, agriculture, shipbuilding, food processing, and the Civil Service.

Chasing gremlins out of chimneys!



Correct baking gives crack-proof plastic finish.

DESPATCH rack-loaded, gas-fired oven with plastic-coated flue liners ready to bake.

A case history of OVEN No. 28,768

DESPATCH BATCH TYPE FINISH BAKING OVENS

Heating engineers have long been plagued by 2 gremlins—*condensation* and *corrosion*—which eat the heart out of a chimney.

When these gremlins get busy, water from condensation unites with sulphur dioxide to form corrosive sulphurous acid ($H_2O+SO_2=H_2SO_3$). The H_2SO_3 eats through ordinary flue liners, bores through bricks, mortar, gradually disintegrates chimney and walls.

To lick chimney gremlins this DESPATCH batch type Finish Baking Oven is used by Heremetal Company of Minneapolis. It bakes or "welds" 4 coats of acid-resistant Heresite plastic to chemically-etched aluminum flue liners.

Prompt Delivery, Immediate Installation

Fast, uniform baking achieves complete polymerization (chemical union) of the 4 plastic coatings and assures positive adhesion to resist heat and corrosion and prevent chipping and cracking. Even hammering will not mar or crack the plastic.

Convection-heated DESPATCH ovens are designed to meet your post war finishing problems. New 1946 models have exclusive features to give faster and more uniform baking . . . greater operating flexibility . . . lower finishing costs.

Available in all standard types, sizes—gas or oil fired. Special sizes on request. *Write* TODAY *for details!*

Single Units or Complete Finishing Systems

DESPATCH OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

PERSONALS

° ° °

• **B. M. Ashbaucher** has been appointed manager of the electrical, wire rope and construction materials dept. of the New York sales office of American Steel & Wire Co. At the same time, **C. W. Meyers** has been named assistant manager of the Wire Rope and Construction Materials Div. of the company's general sales dept. in Cleveland succeeding Mr. Ashbaucher. Mr. Meyers will also continue his duties as special representative to the aviation trade.

• **Edwin O. Kumler** has been appointed assistant director of industrial relations of American Steel & Wire Co., Cleveland, succeeding **Homer J. Weeks,** who recently has retired from that position after more than 40 yr of service with the company.

• **Arthur J. Olson,** heretofore district sales engineer for Link-Belt Co. at Chicago, has been appointed district sales manager at Kansas City to succeed **Max Giffey,** who has resigned after 40 yr service with the company. Mr. Olson has been in the employ of Link-Belt since 1918.

• **Donald E. Irwin** has been appointed industrial relations manager of the Lincoln Div. of Ford Motor Co., Dearborn, Mich. He has been with the Ford Industrial Relations Div. for the past year, having previously served with the FBI. **H. D. Everett, Jr.,** has been appointed to head the new Market Research Div. of Ford Motor Co. For the past several years he directed market studies for Time-Life-Fortune.

• **Merrick H. Swift** has been made vice-president in charge of engineering of the Perkins Machine & Gear Co., Springfield, Mass., and **Donald B. Clarke,** vice-president in charge of sales.

• **J. F. Tholl,** for the past 15 yr general manager, has been elected president of American Tool & Machine Co. of Hyde Park, Boston, succeeding **C. L. Day** who becomes chairman of the board.

• **John E. Crain** has been transferred from the advertising dept. of Joseph T. Ryerson & Co. to the Advertising Div. of Inland Steel Co., Chicago. He will continue as an assistant to Keith J. Evans who is advertising manager of both companies.

• **George W. Requarth** and **J. M. Kaelin** have been appointed regional parts and service managers of the Packard Motor Car Co., Detroit. Mr. Requarth, now Great Lakes region manager, has been affiliated with the automotive industry for 15 yr, and Mr. Kaelin, named Eastern regional manager, has been directly associated with automotive service since 1920.

• **John E. Rosser,** formerly of Heyl & Patterson, Inc., has joined the purchasing dept. of the Levinson Steel Co., Pittsburgh. **Louis Siegel** has also joined the firm.

• **Fred Ray** has been appointed office manager of the Warehouse Sales Div. of Levinson Steel Sales Co., Pittsburgh. **Herbert Lang,** formerly of Jones & Laughlin Steel Corp., has been made office manager of the Warehouse Sales Div., and **Floyd Prunkard** has been promoted to the sales dept. to handle the company's specialties for architects, contractors, and the building trades.

• **Henry J. Helfrich** has been named divisional sales manager of the Houde Engineering Div. of the Houdaille-Hershey Corp., Detroit. He was a member of the engineering staff of the Pierce-Arrow Motor Car Co. from 1920 to 1934, followed by 4 yr as development engineer for the Truck Equipment Corp., before joining Houde in 1938.

• **Joseph G. Curry** has been appointed to the newly created post of assistant sales manager of the Structural Products Div., Wickwire-Spencer Steel Div. of the Colorado Fuel & Iron Corp., with headquarters in Buffalo.

• **Leslie L. Irvin** has been elected president of the Irving Air Chute Co., Buffalo, to succeed **George Waite,** who resigned to recuperate following an operation. Mr. Waite will continue as a director of the company and will also act in an advisory capacity.

•**Jerald L. Kafker,** who has just returned from 3 yr service in the Army, is now associated with the Boston office of Luria Bros. & Co., Inc.

• **J. D. Neuman** has been appointed assistant to the president and director of purchases of the Sharon Steel Corp., Sharon, Pa. **Glenn R. McQuiston** has been appointed purchasing agent, and **P. L. Henry,** production manager of the corporation. **R. E. Cunnick** has been named general manager of sales for Niles Rolling Mill Co., a subsidiary of Sharon Steel.

• **Col. George R. Stanley** has been appointed a member of the sales staff of Chandler-Evans Corp., division Niles-Bement-Pond Co., West Hartford, Conn. Prior to his entrance into the Army, he had worked for the Boeing Airplane Co., Douglas Aircraft Co., and the Aluminum Co. of America.

• **E. L. Stine,** who has been associated with Fairbanks, Morse & Co. for 25 yr in all phases of their scale business and who has been for a number of years scale dept. manager of the company's San Francisco branch, has been appointed supervisor of scale service with his headquarters in Chicago. **Leonard J. Maguire,** who has been assistant to the manager of the Scale Div. in Chicago, has been promoted to the office of assistant chief engineer of the St. Johnsbury works, Vt.

• **Clifford R. Hale** has been appointed general manager of purchasing and traffic for Rheem Mfg. Co., with his headquarters in New York. Mr. Hale formerly was vice-president of Continental Industries, Inc., and previously served for 2 yr in the Army. Prior to entering the service he had been with Air Reduction Sales Co. and U. S. Industrial Chemicals, Inc. for 17 yr where he was general purchasing agent.

• **Roscoe M. Smith,** a veteran production executive at Ford Motor Co., Dearborn, Mich., has been named superintendent of all village industry plants, as well as the Hamilton, Ohio, and Green Island, N. Y., plants. **Clarence C. Swenson,** with the Ford Motor Co. since 1919, has been appointed assistant manager of the company's Atlanta branch. **Benson Ford** has rejoined the company after service in the U. S. Army, and will shortly take over an executive assignment. He is a director of the company.

• **H. Malcolm Priest** has been appointed manager of the railroad research bureau, Pittsburgh, U. S. Steel Corp. subsidiaries. He will supervise research and design in the field of lightweight railroad equipment and other mobile structures, through the application of low-alloy, high strength steels produced by the corporation. The subsidiaries he serves are: Carnegie-Illinois Steel Corp., Columbia Steel Co., National Tube Co. and Tennessee Coal, Iron & Railroad Co. He joined the U. S. Steel railroad research bureau in 1933 after 10 yr as a designing engineer for American Bridge Co.

• **David Crawford** has been appointed midwest district sales manager of the American Welding & Mfg. Co., Warren, Ohio. This district includes southern Ohio, Kentucky, Indiana and a portion of Illinois.

• **P. W. Brown,** recently retired director of manufacturing for Wright Aeronautical Corp., has been named a member of the board of directors and the executive committee to serve as director of production for Tyson Bearing Corp., Massillon, Ohio.

• **Eugene D. Milener** has been appointed coordinator of general research of the American Gas Assn., New York. At the same time, **Mahlon A. Combs** has been promoted from assistant secretary of the industrial and commercial gas section to secretary, suceeding Mr. Milener in this post.

• **Alfred P. Miller,** general superintendent of Inland Steel Co., East Chicago, Ind., has been elected chairman of the National Open Hearth Steel Committee, American Institute of Mining & Metallurgical Engineers, New York. Mr. Miller succeeds Leo F. Reinartz, manager, Middletown Div., American Rolling Mill Co., who has directed the affairs of this important group for almost 20 years. **E. L. Ramsey,** for many years superintendent of steel production, Wisconsin Steel Works, South Chicago, and active on the National Open Hearth Steel Committee since its inception in 1925, has been elected vice-chairman. **Frank T. Sisco,** secretary of the Open Hearth Conference since 1942, has been re-elected.

EDWARD G. ENGLISH, executive assistant to the president, Bethlehem Pacific Coast Steel Corp.

•**Edward G. English** has been appointed executive assistant to H. H. Fuller, president of Bethlehem Pacific Coast Steel Corp., San Francisco. Mr. English was formerly manager of commercial research and supervisor of Pacific Coast mill scheduling. He formerly worked for the Sheffield Steel Corp. in Kansas City, where he became assistant night superintendent of the sheet mill, and then became affiliated with the reinforcing dept. of Pacific Coast Steel Co. of Seattle in 1925. In 1936 Mr. English was transferred to the general offices of that company in San Francisco which had become a part of the Bethlehem organization in 1930. **Orin P. Walker** has been named as manager of commercial research succeeding Mr. English. Mr. Walker was formerly assistant sales manager of Petroleum Equipment International and shortly after this company was acquired by Bethlehem joined that company's commercial research staff.

• **E. H. Welker,** president of Welker Machinery Co., Inc., Detroit, has been elected to the board of directors of General Machinery Corp.

• **Nelson F. Wilmot** has been appointed Chicago district sales manager and **Merle S. Clark** becomes St. Louis district sales manager of the Mathieson Alkali Works, New York. Both men joined Mathieson in 1931.

• **Charles W. Wood,** who acted as sales representative in the New Orleans territory for Lukens Steel Co., By-Products Steel Corp. and Lukenweld, Inc., in 1940 and 1941, has resumed this service upon his release from the U. S. Coast Guard.

• **J. G. Curry** has been appointed assistant sales manager of the Structural Products Div., Wickwire Spencer Steel, and will make his headquarters in Buffalo. Mr. Curry has been with the company for some years and has recently been assigned to special sales work in connection with the merchandising and promotion of Clinton welded fabric.

• **D. Paul Ayers,** formerly division engineer of the Kansas Power & Light Co. at Topeka, Kans., has joined the sales engineering staff of Copperweld Steel Co., Glassport, Pa.

• **G. Webber Knight** has been appointed manager of the Washington office of Pennsylvania Salt Mfg. Co. He has been with the company for 21 yr in managerial positions.

• **Bruce R. McIntyre, Jr.** has joined the Southwest Steel Corp., Pittsburgh, and will direct the activities of the company in the south and southwest, making his headquarters at Memphis. For the three years prior to joining Southwest Steel Corp., he had been assistant to the purchasing agent and manager of salvage for Copperweld Steel Co., Glassport, Pa.

• **F. H. Kilberry,** former president of the Atlas Imperial Diesel Engine Co., Oakland, Calif., has been elected executive vice-president and a director of the Nordberg Mfg. Co., Milwaukee. He succeeds **C. E. Stryker,** former vice-president and assistant to the president, who becomes president of the Adel Precision Products Co. of Burbank, Calif.

• **John May,** vice-president in charge of sales, American Steel & Wire Co., Cleveland, has been appointed assistant to Clifford F. Hood, president of the company, to aid in general commercial and sales policies. **Harry M. Francis,** who has been elected vice-president in charge of sales, succeeds Mr. May. Mr. Francis has been assistant vice-president.

• **R. K. Beall** has been appointed a vice-president and director of Earle M. Jorgensen Co. retaining his position as manager of sales of the Los Angeles office. **A. J. Stetter** and **P. C. Childs** also have been appointed vice-presidents of the company as well as district managers of the Houston and Oakland offices, respectively.

• **A. F. Franz** has been appointed works manager of the Colorado Fuel & Iron Corp., Denver, and will have complete jurisdiction over all operations including the Minnequa steel plant, coal mines, iron mines and quarries, water dept. and such other departments as may properly be considered as part of the operating dept. All sales of steel products will be under the jurisdiction of **J. D. Sullivan** who assumes the title of vice-president and general sales manager, Steel Div.

• **Luther L. Yaeger** has joined the staff of the Bjorksten Laboratories, Chicago, as research chemical engineer in the plastics dept. He formerly was associated with the Youngstown Sheet & Tube Co.

• **E. S. Stockslager** has been appointed assistant district sales manager of Harbison-Walker Refractories Co.'s New York district. Other assistant district sales managers recently appointed are: **E. M. Sarraf**, Cleveland; **H. S. Schweinsberg**, Philadelphia; and **J. H. Owen**, Chicago.

• **Henry L. LeMay** has been named manager of the Chicago office and warehouse of Bay State Abrasive Products Co. of Westboro, Mass. For the past 3 yr, he has been active in the abrasive sales field in Chicago where he was associated with the Norton Co.

• **J. E. Niederhauser** has been appointed manager of industrial relations, Continental Can Co., New York, following the resignation of **B. M. Brock**. Mr. Niederhauser was formerly in charge of industrial relations for the company's Paper and Plastics Divs. with headquarters in Van Wert, Ohio.

• **E. R. Galvin**, formerly president of Tyson Bearing Corp. of Massillon, Ohio, has been named executive vice-president, general sales manager and member of the board of directors of LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. **S. L. Myers**, who has been vice-president and general sales manager during the past year, has been named vice-president and export sales manager, while **Jay M. Fetters**, former export manager, becomes manager of foreign development.

• **Paul K. Povlsen**, vice-president in charge of production at the J. I. Case Co., Racine, Wis., has resigned to become vice-president and general manager of Maguire Industries, Inc., New York.

• **William Gladden** has been added to the customer service staff of Pemco Corp., Baltimore, and will cover the midwest territory. He had been with Pemco for 23 yr. up until the war. **Harold J. Giraud** has also been added to the staff and will cover the West Coast.

• **Capt. John A. Strother**, USNR, has rejoined Pitney-Bowes, Inc., Stamford, Conn., in the newly created post of director of development and research. He was the company's chief development engineer when he joined the service in 1940.

• **Mason Britton** has been elected president of the Metal Cutting Tool Institute, Hartford, Conn. Mr. Britton was formerly vice-president of McGraw-Hill Publishing Co., treasurer of War Advertising Council, director of Tools Div., Office of Production Management, and administrator of the Surplus War Property Administration and Surplus Property Board.

• **W. D. Cleavenger** has been appointed Chicago district manager for American Welding & Mfg. Co., Warren, Ohio. He has been in the company's sales promotion dept. since 1943.

• **Dave B. Mallett**, who was with Packard Motor Car Co. during the war, has joined the Service Detroit Div. of Federal-Mogul Corp.

...OBITUARY...

• **Edward L. Koons**, 84, president of Sylvanite Gold Mines, Ltd., died Feb. 24 at his home in Buffalo.

• **Frederick W. Holtz**, 65, a foreman in the copper dept. of the American Brass Co., Buffalo, for 36 yr, died Feb. 28.

• **Walter R. Frame**, 74, prominent banker and a director of the Waukesha Motor Co. and Alloy Products, Inc., both of Waukesha, Wis., died Feb. 21, at Sebring, Fla.

• **Walter H. Metcalf**, 47, contracting engineer for Pittsburgh-Des Moines Steel Co., died suddenly Feb. 19 while on a business trip to Helena, Mont. He had been associated with the company since 1922.

• **Michael Acton**, 56, president of the Oliver Machine Tool Co. of Boston, died recently.

• **Arthur E. Hedstrom**, 76, president of Hedstrom-Spaulding, Inc., Buffalo, died Feb. 24 at Vero Beach, Fla.

• **Frank T. Crowe**, 63, construction engineer internationally known for his work on Boulder, Shasta, and many other dams, died in Redding, Calif., Feb. 26. Specializing in dam construction, he worked on many structures for the U. S. Bureau of Reclamation, Utah Construction Co., and Six Companies, Inc.

• **Nels Nelson**, 54, production engineer for the Nordberg Mfg. Co., Milwaukee, died Feb. 26 of a heart ailment at a hotel in St. Louis, while on a business trip.

• **James A. Ridgely**, noted metallurgist, died recently while on a visit to Indianapolis, where he had offices as a consulting metallurgist for Holliday Steel Co., Hammond, Ind. He had formerly been with Crucible Steel Co., Pittsburgh, for 25 yr.

• **John F. Schulte**, retired president of Schulte Brass Mfg. Co., died at his home in Cincinnati recently. He had retired from active business 4 yr ago, after working in this brass manufacturing company which he founded in 1923.

FOR SPEED IN REACHING YOUR MARKETS

specify

Today—when every unit coming off your production lines is of utmost importance in supplying your markets and establishing future business—Follansbee service on Cold Rolled Strip merits your attention.

Check with any Follansbee Office or Sales Agency. You are assured on three points—1, Prompt attention to your inquiries . . . 2, Faithful performance in meeting shipping schedules . . . 3, Cold Rolled Strip which conforms in every respect to the specifications accepted.

COLD ROLLED STRIP
ELECTRICAL SHEETS AND STRIP
CLAD METALS
POLISHED BLUE SHEETS
SEAMLESS TERNE ROLL ROOFING

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Houston, St. Louis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto & Montreal, Canada.
Plants—Follansbee, W. Va. and Toronto, O.

Follansbee

COLD ROLLED STRIP

Dear Editor:

WELDING NICKEL-ALLOY STEEL

Sir:

The article by T. N. Armstrong entitled "The Welding of Nickel-Alloy Steels," in the Jan. 24 issue aroused considerable comment in our organization because of our close contact with the development of electrodes for welding hardenable steels.

We should like to clear up a point about electrode coatings which may cause confusion. Mr. Armstrong's phrase, "cracking tendencies are lowered in some highly hardenable alloy steels by welding with electrodes covered with a *lime or other inert type of coating*," was the current usage in the welding electrode industry. In the "Newsfront," however, this has been reported as "electrodes coated with *lime or other inert coating*." This is a serious misinterpretation of the term "lime type." A "lime type" coating is one which, if chemically analyzed, is reported to have a high percentage of CaO. Actually no electrode manufacturer uses lime as such in an electrode coating. If he should, the qualities attributed to the "lime type" coating would not be obtained. Instead the manufacturer uses calcium bearing minerals which should not be considered "inert" excepting in the sense that they do not have the power to react with the high temperature steel immediately adjacent to the weld in the same manner as hydrogen. The most common calcium bearing material is limestone ($CaCO_3$) which in the welding arc gives off carbon dioxide, and this gas has a very important function in the control of underbead cracking.

As Mr. Armstrong states, hydrogen appears responsible for the appearance of cracks, and electrodes which contain organic materials give off large amounts of hydrogen in the arc atmosphere. In hardenable steels the hydrogen causes fissures which may be likened to hydrogen flakes encountered in steel processing. Moisture in electrode coatings will similarly give sufficient hydrogen to cause cracks. But all electrodes contain some moisture and unless the hydrogen resulting from this moisture is diluted by other "inert" gases, the partial pressure of the hydrogen may be sufficient to cause underbead cracks. Limestone provides that "inert" gas as carbon dioxide or carbon monoxide, thus lowering the proportion of hydrogen to safe levels.

Another common term for the electrode coatings for this special application is a "stainless type" coating. This term is particularly appropriate because it points out the similarity of the electrodes to those using stainless steel core wire and also indicates its ancestry. During the war when armor was being welded with stainless electrodes and the shortage of alloys threatened to interfere with this vital welding project, a manufacturer familiar with stainless electrode coatings gave birth to the idea of a stainless coating on a low alloy electrode for armor welding. The term "lime type" was a hold over from stainless usage where electrode coatings were classified either as a lime or titania type.

R. DAVID THOMAS, JR.
Research & Engineering Dept.
Arcos Corp.,
Philadelphia

BRAZED AUTO ENGINE

Sir:

Will you please send me a copy of the article entitled "Brazed Sheet-Metal Automobile Engine" which appeared in your Jan. 24 issue.

SCOTT J. HARRISON
Sales Dept.
Metal Goods Corp.,
Houston

● Tear sheets have been forwarded.—Ed.

METAL FINISHING

Sir:

We would appreciate very much your forwarding to us one copy of "Metals, Finishes, and Finishing Processes." We are enclosing 50¢ in stamps to cover the cost.

H. M. SELLEI
Nox-Rust Chemical Corp.,
Chicago

● Reprint has been forwarded.—Ed.

ELECTROPOLISHING

Sir:

The January 1946 issue of THE IRON AGE carried under the heading "Newsfront" statements regarding electropolishing and plating of bright parts as applied to the automotive industry. Can you furnish me with information as to specifications for specific bright finished parts used by car manufacturers. I am particularly desirous of learning the requirements for bright chrome, thickness of copper and nickel under plates, etc.

HUGH W. ROLL
Inspection Supervisor
Pratt & Whitney Aircraft Corp. of Missouri,
Kansas City

● The American Society for Testing Materials has established Specification A 166-41T, covering nickel, copper and chromium standards. However, the large automobile manufacturers have each worked out their own specifications, some of which are in excess, so far as the nickel is concerned, of the specification of the ASTM. Committee B8 of ASTM is conducting experiments of heavier electrodeposited nickel coatings, as is the Research Committee of the American Electroplaters Society. In some instances car manufacturers have adopted a minimum nickel plating standard of 0.002 in. thickness.

The National Bureau of Standards, together with the American Society for Testing Materials and the American Electroplaters Society, has published a bulletin on the protective value of nickel and chromium plating on steel, in which some very interesting information is presented. This may be obtained from the Superintendent of Documents, Washington, for 10¢ a copy. It is research paper RP 712.—Ed.

ELECTRODEPOSITION OF IRON

Sir:

Will you please send us a copy of the article starting on p. 54 of the Jan. 10 issue, which describes electrodeposition of iron.

FRED W. CEDERLEAF
Assistant to Executive Vice-President
Borg-Warner Corp.,
Chicago

● A copy of "Precision Seamless Tubing by Electrodeposition" has been mailed.—Ed.

CHINESE STUDENT

Sir:

I am a Chinese student sent here by our government to study printing press manufacture. Your IRON AGE magazine interest me very much. Will you kindly send me a copy of "How to Make Cutting Tools Last Longer."

TUNG WEI-LIANG
YMCA Hotel,
Chicago

● We are very sorry, but we have exhausted our supply of both reprints and tear sheets. However, the John Crerar Library, 86 E. Randolph St., Chicago, has copies of THE IRON AGE on file and you could undoubtedly arrange to have photostats of the article made.—Ed.

TIN UNDERCOATS

Sir:

We read with interest the article on "Tin Undercoats for Painted Steels Improves Corrosion Resistance" in the Dec. 6 issue, p. 64, of THE IRON AGE. We are interested in this process in connection with our acoustimetal ceilings and will thank you to advise whether we could obtain further data on this subject.

THOMAS McCLIVE
Purchasing Dept.
National Gypsum Co.,
Buffalo

● While the article we published in that issue was representative of the study made by the Tin Research Institute on this problem and reported to the British Iron & Steel Federation, you can likely obtain the answer to specific questions if you write direct to these organizations. The British Iron & Steel Federation address is 24 Old Broad St., London E.C. 2, and the Tin Research Institute is Fraser Road, Perivale Greenford, Middlesex, England.—Ed.

IT'S THE *Encore* THAT COUNTS

Like the entertainer who gauges his success by the applause for more, a manufacturing supplier measures success by repeat orders on the books. No material property at Transue is more proudly considered than its list of long-standing, prominent T&W steel stamping users. Transue guards this "encore audience" zealously. New customers are assured of this same unwavering attention to assembly tolerances and clearances, desired physical properties, uniformity, finish and trim on each deep drawn stamping job.

DESIGNERS AND MAKERS OF DEEP DRAWN STAMPINGS

TRANSUE & WILLIAMS

ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Detroit, Indianapolis, Cleveland

This Industrial Week . . .

- ***Ingot Rate Up 8.5 Points to 85 Pct***
- ***Coal Strike Will Cause Decline***
- ***Steel Order Volume Expands***

WITH wartime speed, the steel industry was forging ahead this week in an attempt to make as much steel as possible before operations might be curtailed because of a coal mine shutdown. Steel ingot output this week advanced 8.5 points to 85 pct of rated capacity. Even though the present percentage is based on less capacity because of revisions early this year, actual weekly output is on a par with prestrike activity.

Between now and the period in April when a possible slowdown in steel production may occur, steel output is expected to gain rapidly. Equipment is now in good shape and previous difficulty in obtaining manpower has lessened considerably. Nevertheless coal stockpiles at steel companies are still no more than for two to three weeks' operations on the average.

Because of the fear in some circles that the coal strike, if it occurs, will be a lengthy one, steel companies are being forced to make tentative plans for slowing down some operations as soon as the strike is called. In previous periods when a coal strike was called, steel companies hung on as long as possible and then had to make drastic adjustments when supplies ran out or reached the low point. By starting a slowdown in operations early, the conservation of coal allows a more economical operation of coke ovens and blast furnaces and leaves the industry in a better position for a full-scale output when the coal strike is ended.

REALIGNMENT of sales territories by steel producers has stepped up in recent weeks, swelling the rank of consumers who must find new sources of supply. In a fashion that should bring joy to the hearts of the Federal Trade Commission, mills are drawing in their lines and confining a large part of their shipments to the more profitable nearby areas. Firms in such regions as Pittsburgh, Wheeling, Youngstown and Buffalo are restricting their sales in the Midwest, particularly on sheet and strip products.

Chicago producers are cutting down on sales to areas from Detroit eastward. Concurrently, neighborhood customers are being favored on quotas and one western mill is reported giving unlimited tonnage to customers in its state. Steel users dropped from the rolls under the new sales pattern are flocking to sales offices of local producers, but with little success.

This hurly-burly in reshaping sales policies is a direct result of the inadequacy from the steel industry's standpoint of the recent price advance. In order to pay the 18½¢ an hr increase in wages and at the same time strive for a good financial showing, steel firms have had to draw in their belts tighter and seek every means possible to effect economies. Having explored this method of cost cutting during the war, there are not many corners left to cut.

On the production side cost cutting is taking the form of strict adherence to the 40-hr week and the streamlining of the distribution of steel production to eliminate money losers and low profit products. Items which were not advanced enough to take them out of the high cost category are being made in less quantities and more emphasis is being placed on the products which show a better return. Until such time as the steel industry has determined the full effects of the various price adjustments on its profit sheet, some products will be difficult to obtain.

New steel business last week surged ahead farther and the order volume now being placed is at the prestrike level. Specified tonnage or what is called a firm backlog this week averaged about seven months' full production on an industry basis at the present rates, although certain products are further extended. Until such time as the steel industry is able to eliminate huge carryovers because of the shutdown in February, the placement of fresh orders becomes a mere formality.

Many steel firms are not accepting orders unless they involve specific items, delivery promises on which are not so far extended. For example, one company will take orders only for wire rope, cold-finished bars and certain sizes of hot finished bars. Another company had ordered its district offices not to enter any orders at the home office until ten days after the end of the strike and even then were cautioned to refuse business where deliveries are beyond three months. All these restrictions, however, are not dampening the spirits of steel consumers who are clamoring more each week either for steel or for definite delivery promises.

IN the past few weeks three producers of stainless steel (not under price control) have announced price advances of 8.2 pct. This raise so far, however, has not been announced by several other large stainless steel makers. Some clarifying action may be expected this week.

Export directives on additional steel products may come soon. Steel shipments abroad this year have been running about 40 pct below 1945, partly due to the ending of lend-lease and other financial aids and partly due to supplying domestic demands. Inquiries have been heavy for pig iron and semifinished products for continental countries which have been unable to get raw material production underway in quantity.

Currently railroad carbuilders have on their books 40,670 cars for domestic railroads and 36,750 cars for foreign delivery, the latter representing a French order. Inquiries are out for 20,000 cars from the Polish Government which call for 1947 delivery and bids may be opened this week.

The flow of finished steel to warehouses has not reached prestrike levels and inventories are generally low. Because of depleted stocks, warehouses have been unable to attain 1945 sales levels and business this year to date is about 20 pct below the same period last year.

• **REDISTRIBUTING INDUSTRY**—As a part of the trading estates program outlined before the war, new firms are planning to move to the Scottish Development Area surrounding Glasgow. Where the Rolls Royce Co. was building aircraft engines during the war in 2,000,000 sq ft of floor space at the Hillington estate, a wholesale cooperative and a ball bearing company are now preparing new operations. Two other firms have also reserved space in the surplus plant, and others are expected to do so in the near future. The Board of Trade reports that 125 London firms who lost their premises through enemy action or who were in unsuitable premises are preparing to depart the "over-industrialized" Greater London Area.

• **FEBRUARY STEEL OUTPUT RECORD LOW**—The recent steel strike was reflected in a sharp drop in steel output in both January and February, according to the American Iron & Steel Institute. In December last year, the most recent month unaffected by the industry-wide strike, production was 6,058,799 tons. In comparison, output in January dropped to 3,869,076 tons due to the strike which started on Jan. 21 and in February it dropped still further to 1,353,674 tons. The latter figure was the lowest monthly output since March 1933. During December the industry operated at an average of 74.8 pct of capacity, which compares with operating rates of 49.6 pct in January and 19.2 pct in February. Steel production averaged 1,370,769 tons per week in December, dropping to 873,381 tons per week in January and 338,418 tons per week in February.

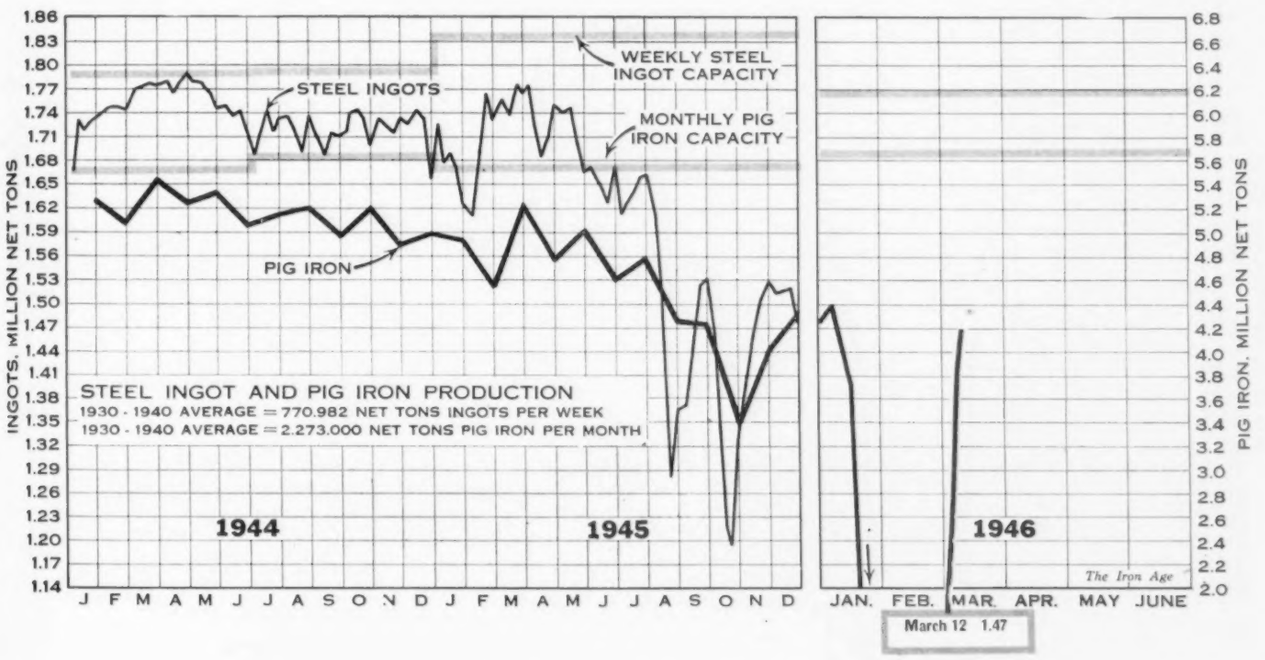
• **FIRST TIME IN HISTORY**—Common stock of the Cincinnati Milling Machine Co. sold publicly for the first time in the history of the company, was distributed outside Cincinnati. However, the stock is finding its way back to the city. A prospectus shows W. D. Gradison & Co. was given 4000 shares and Benjamin D. Bartlett & Co. 2000 shares.

• **REVOKES CORUNDUM RULE**—CPA has revoked the corundum order, M-98, effective Mar. 11. With supplies in better balance CPA feels that allocations are no longer necessary.

• **ARMY SCRAP SALES**—Army scrap sales for the month of January continued their downward trend. Total ferrous scrap sold was 63,950 gross tons; copper and brass, 6,714,500 lb; aluminum, 4,029,600 lb; and other nonferrous, 6,022,400 lb. January is the last month for which figures will be available on a tonnage basis. Shortage of personnel has forced the Readjustment Div. to discontinue this reporting. Future reports will be expressed in dollar values.

• **INGOT MOLD INCREASE**—Effective Mar. 1, ingot mold producers were granted a price advance of $2.49 a ton, due to an increase in labor rates. Contracts by these producers are made on a yearly basis with the provision that changes will be made in case an increase or decrease in the labor rate causes a change in the price. These producers have many times been behind the eight-ball due to contract provisions and the rapid change in labor rates as well as increased costs for pig iron. If pig iron prices are advanced and it appears likely that this will be done in the very near future, ingot mold makers will again find themselves in a spot where some sort of an adjustment will be indicated.

• **ATTENTION JOHN SMITH**—Chester Bowles in announcing the Administration's new wage-price policy addressed himself to John Smith, head of America's average family. He sketched a hopeful picture of lasting prosperity for industry, labor and the farmer in which the only obstacles were psychological fears, doubts and blind self-interest. "This bulge-in-the-line," he said, "will open the gates to a flood of goods."


INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
STEEL INGOT AND PIG IRON PRODUCTION
1930 - 1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930 - 1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
1944
1945
1946
J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
March 12 1.47
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

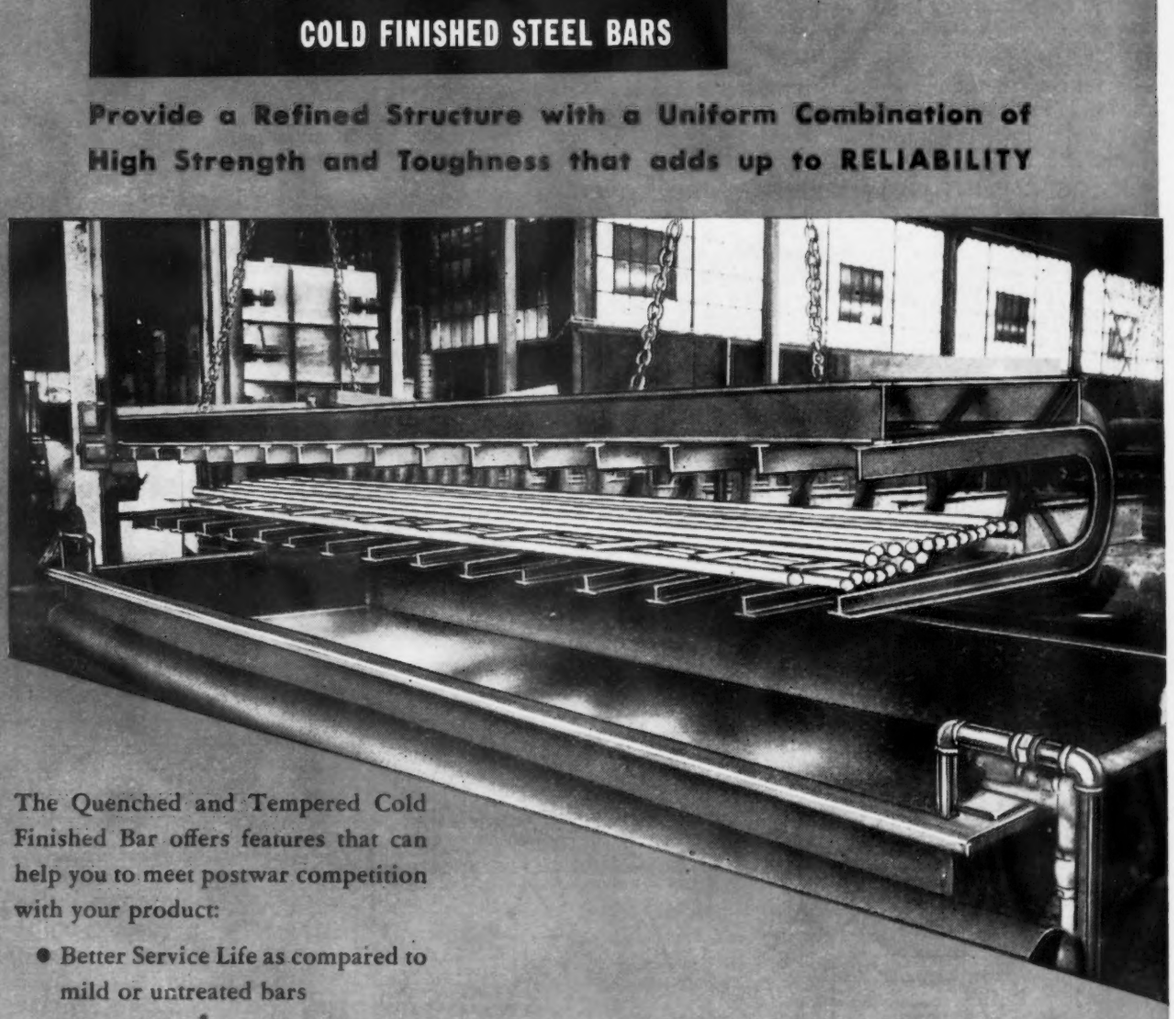
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
March 5	91.0	75.0	69.0*	55.0	88.0*	53.0*	94.0	83.0	93.5	44.0	50.0	83.0	102.0	76.5
March 12	97.0	86.0	76.0	78.0	93.0	71.0	94.0	95.0	93.5	58.0	90.0	94.5	95.5	85.0

* Revised

WYCKOFF

QUENCHED AND TEMPERED COLD FINISHED STEEL BARS

Provide a Refined Structure with a Uniform Combination of High Strength and Toughness that adds up to RELIABILITY



The Quenched and Tempered Cold Finished Bar offers features that can help you to meet postwar competition with your product:

- Better Service Life as compared to mild or untreated bars
- Lower Cost as compared to Heat Treating after machining with the attendant straightening, cleaning and finish machining operations
- Better Reliability as this method of producing High Strength does not sacrifice other valuable Mechanical Properties

We will be glad to discuss with you the application of Quenched and Tempered Cold Finished Steel Bars to your production.

Wyckoff STEEL CO.

First National Bank Building · Pittsburgh 30, Pa.
3200 South Kedzie Avenue · Chicago 23, Illinois
Works at Ambridge, Pa., Chicago, Ill., Putnam, Conn., Newark, N. J.

Steel Wage-Price Settlement to Force Production Economies

New York

• • • The feeling is growing in some steel circles that the general steel price level if raised much further would endanger the use of steel for some applications and provide considerable new business for competing materials. These sources do not say that if the present price adjustment results in a poor financial showing that further increases are unnecessary. The gist of their viewpoint is that a halt must be called soon to the continual rise in prices and wages.

Steelmakers are well aware this week that their coal costs, which are an important part of the steelmaking picture, will be increased as a result of John L. Lewis' demand. That such increases will be heavy is already a foregone conclusion to steelmakers. Whether or not it will form a firm basis for a new request for higher steel prices remains to be seen.

By the time such increased coal costs become a fact, the steel industry will also have had time to gather data on the effect of the recent average $5 a ton increase. It is logical to assume that if a new plea for price adjustments is made to the OPA, it will be made on the basis of total costs which would include the increase in coal mining expenditures.

Despite reports to the contrary, the great majority of steel producers are solidly against a price movement for steel which would eventually lead to a spree of price cutting which occurred in the fall of 1937 and all through 1938. Extreme measures have been taken to study steel prices in the light of actual experience and cost rather than on a traditional basis.

It was for that reason that so many different price adjustments were allocated recently. An attempt was made, with few major exceptions, to apply increases to those items on the basis of a varying degree of actual cost or loss. So many hands were in the pie, however, that it is doubtful if the result will cause much change in the product-mix of steel production.

Many items which did not receive an advance that the steel industry thought they were entitled to, may be in even less production now than before the adjustments were made. Steel companies in order to pay one of the highest wage boosts in their history, are using every means at their disposal to cut steelmaking costs. It is obvious that no company will continue to make products which do not bring a satisfactory return.

By TOM CAMPBELL

o o o

The only exception to this general rule is that which includes a number of products manufactured for traditional purposes. Although semi-finished steel might be difficult to obtain there is no concrete evidence that the larger units are purposely withholding this material from smaller companies in order to put them out of business. According to reliable steel sources, this type of business is needed during periods when the mills find it difficult to balance their primary equipment with their finishing mills.

The same thing is relatively true on concrete bar production. The recent $4 a ton increase has temporarily at least placed this product at a disadvantage and will cause many companies to be niggardly in doling out supplies. The cost factor enters into this angle as well as the better return on hot-rolled bars which not only bring a higher price but receive a bigger boost than concrete bars.

Whether or not production of low-cost items can be speeded up or fitted in with the overall production pattern is pretty much of a controversial question. Until steel mills have had a chance to completely explore the effects of the latest price increases, it is certain, according to reliable sources, emphasis will be placed on the production of the more lucrative items.

In order to make good on the recent wage boost, steel companies are being forced to reshape their sales policies, taking into account geographical markets as well as the elimination of long freight hauls. While it is too early to make a prediction, decentralization of steel markets is in the making, according to some steel market research analysts. Studies have been under way for the past year or so which have laid emphasis on the futility of too much freight absorption on steel orders and already many companies have trimmed their sails extensively.

Steelmakers are not unmindful that other metal producers who are bidding sharply for many markets which use stainless steel, alloy steel and other specialties, will do everything in their power to keep their prices low in order to gain a foothold. Even though the Aluminum Co. of America may be forced to ask for higher prices because of the recent wage boost, which incidentally was given before a price increase, the action will be taken reluctantly, according to some sources.

The long campaign by Alcoa in presenting public statements on the continuous reduction in aluminum prices is something which cannot be bandied around lightly. Furthermore, the result of this campaign in itself will force Alcoa to use every means at its disposal to keep the price of aluminum as low as humanly possibly. To a similar extent this philosophy applies to other metal producers and plastic concerns who are now embarked on a campaign to enlarge their markets far beyond prewar size.

Et Tu Brutus

London

• • • With Great Britain straining to increase its exports and with a goal of 1000 cars per week having been set for shipment out of the country, the nation's automobile workers at many points are out on strike.

Early this week more than 16,000 automobile workers were staging an outlaw strike and there was fear that the wildcat strike committee would call out 40,000 more in 11 plants in Coventry.

None of the strikes has union approval. The situation is so serious from an export standpoint that employers are dealing directly with wildcat strike leaders.

Bowles Heralds New Wage-Price Policy as Helping Material Flow

Washington

• • • **The government's wage-price** policy will facilitate the greatest flood of goods this great nation has ever seen, Chester Bowles, Director of Economic Stabilization said in outlining the President's bulge-in-the-line program.

The new regulations cover five classes of wage and salary increases:

(1) Increases consistent with a general pattern of wage or salary adjustments established in a particular industry, or in a particular local market.

(2) Where no pattern has been established, increases necessary to eliminate a gross inequity between wage rates or salaries in related industries, plants, or job classifications.

(3) Increases necessary, where no pattern exists, when salaries or wages should be advanced to equal the percentage increase in the cost of living, which has been fixed at 33 pct.

(4) Increases necessary to correct substandard rates.

(5) Increases in exceptional cases which may still arise under the wartime wage standards in effect on Aug. 17, 1945, to meet special problems, such as fringe adjustments, merit increases and bonus plans.

"The new policy," said Mr. Bowles, "would not work automatically. Everybody must want to make it work even at the cost of a little sacrifice. The only obstacles now present to lasting prosperity with better than adequate profits for industry and farmers were psychological," he said. "Our progress toward that goal is being delayed by fear and doubt and blind self-interest. Those are the bottlenecks we must break," he declared.

"There is nothing inevitable about inflation," Mr. Bowles said, "and the tools are at hand to prevent it and to put the national economy on a foundation which would be secure long after the present emergency was forgotten."

Along with the eight-page technical regulations, a series of 91 questions and answers was presented to clarify some of the confusion attending the many wage policy statements made by high Administration officials. One of the basic questions in this document was "What is the importance of the new cost-of-living standard?"

The answer provided was as follows:

"The cost-of-living standard will be the principal basis for approval of wage or salary increases for employees in industries in which no pattern of adjustment was established between Aug. 18, 1945, and Feb. 14, 1946, and which are not found to be related to any industry in which such a pattern was established."

The question of patterns was dealt with in several questions. A fundamental statement was made that no nation-wide pattern of wage or salary increases had been established by recent wage settlements. Patterns which were recognized were those which applied to particular industries, it was said, and to those established for particular or related industries within a particular labor-market area. The answer to this particular question concluded:

"These patterns vary from industry to industry and from locality to locality. In many industries and localities no post-VJ-Day pattern was established before the date of the Presidential order. In these industries and localities, the principal standards of approval of wage and salary increases will be the 'gross inequity' standard and 'the cost-of-living' standard."

A separate bloc of questions and answers was provided for OPA problems, and the first of these, No. 40, stated that OPA could not advise an employer engaged in wage negotiations what price increases he might be entitled to if he should make a certain, approved wage increase.

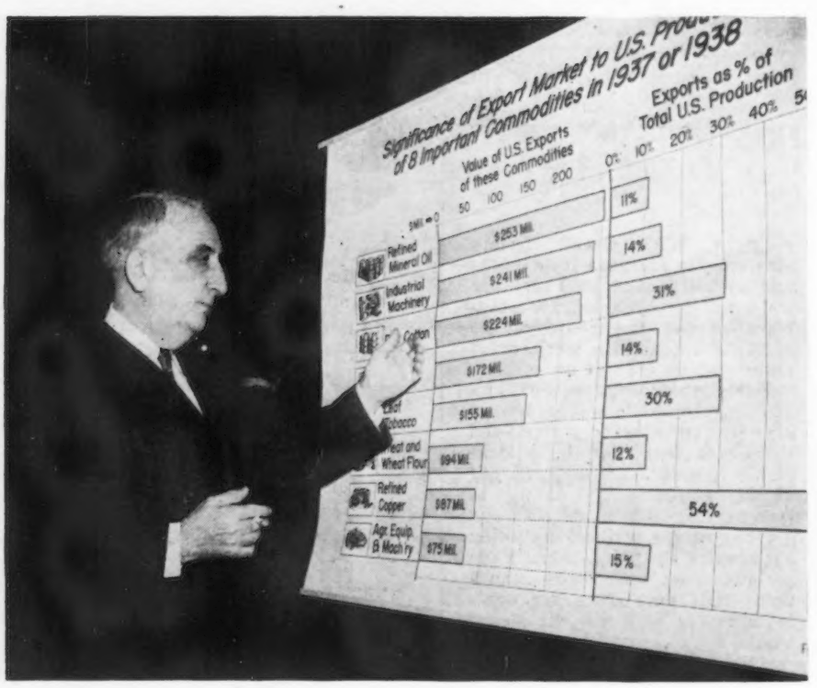
It was explained that OPA could not become entangled in wage negotiations if it were to speed production by prompt and fair price adjustments.

•

Washington

• • • **Chester Bowles** in an attempt to placate alarm over the new wage-price policy of the Ad-

ADVOCATES LOAN APPROVAL: *Secretary of the Treasury, Fred M. Vinson, urging approval of the* $3,750,000,000 *loan to England, points to an export chart during his appearance before the Senate Banking Committee.*



ministration has issued the following questions and answers on the matter:

Question: What is the purpose of the new wage-price policy announced by President Truman on Feb. 14 in Executive Order No. 9697?

Answer: To maintain the stability of the economy in the present emergency and to clear the decks for full-speed-ahead in production. The order provides: First, a basis for reasonable wage settlement in all cases. Labor is assured the opportunity to obtain wage adjustments in line with those worked out in free negotiations, or recommended by the government, since VJ-Day. And, second, prompt adjustments in price ceilings wherever they are necessary to relieve hardship or increase production of essential goods.

Question: What are the basic similarities between the new wage-price policy and the previous policy?

Answer: The new policy is not a new program but an adaptation of the old to fit present conditions. The new policy, like the old, calls for free collective bargaining within the framework of the stabilization program. Except in a few special situations, it imposes no direct prohibitions on wage or salary increases. Like the old, the new policy puts limits upon the extent to which wage or salary increases can be reflected in higher prices or higher costs under government contracts. Such increases must be approved by the government before they can be used for these purposes.

Question: What are the principal differences between the new wage-price policy and the previous policy?

Answer: Under the old policy the standards for approval of wage or salary increases were relatively limited. These standards were not intended to limit the amounts of the increases which would actually take place. On the contrary, so-called unapproved increases, over and above the standard for approval, were encouraged. But these unapproved increases could not be reflected in higher ceiling prices right away. After a six-month test period, however, OPA was directed to take them into full account and to give any price relief which the test period showed was called for under established pricing standards.

In many industries, however, labor has suffered a severe loss in take-home pay, as a result of loss of overtime, downgrading and similar factors. In some of these industries, employers could not absorb even for a test period, the increase in wage rates which were necessary to give labor at least partial compensation for this reduction in earnings and to offset the increases in the cost of living since before the war.

The new policy liberalizes the standards for approval of wage and salary increases. The basic standard consists of the patterns of adjustment which have actually been established in the various industries and localities during the period between VJ-Day and the date of the order.

Having liberalized the standards for approval, the new policy no longer encourages unapproved wage or salary increases. Consideration of such increases is barred, not merely for six months, but for the duration of the stabilization laws in determining either price ceilings or cost under government contracts.

Wage or salary increases which are going to be used in applying for price relief immediately, or for increasing costs to the government, must be approved in advance.

Question: Will the new policy require prices to be increased wherever wage rates have gone up?

Answer: Far from it. Higher wage rates do not necessarily mean proportionately higher labor costs. Loss of overtime, downgrading, an improved labor force and other factors, offset the effect of higher rates on labor costs in whole or in part.

Question: What does the new wage-price policy mean to the average American family which is so concerned about the cost of living?

Answer: First of all, it means that consumers can expect to get larger supplies of refrigerators, washing machines, automobiles and all the other peacetime goods we're all waiting for. Secondly, it will not mean a new higher level of prices. More than two thirds of the average family's expenditures go for food, rent and clothing. The new wage-price policy should have no effect on rents and little or no effect on food and clothing. Special steps are being taken to increase production of

SOUTH AMERICA BOUND: *Trade to South America has picked up recently. Here is a Willys-Overland jeep being made ready for shipment.*

low-priced clothing and thus to reduce the average family's clothing bill. Prices for some metal goods will undoubtedly increase somewhat. Such increases mean a bulge in the price line. But there will be no break-through.

Question: What does the new wage-price program mean to the average employer?

Answer: It means quicker settlement of wage problems. It means prompt price relief where hardship exists under fair-pricing standards. It means that the way is cleared for all-out production.

Question: What does the new wage-price policy mean to the average worker?

Answer: It means that barriers to fair wage and salary adjustments, through collective bargaining or otherwise, are removed. It means that the worker is protected against a runaway cost of living which would destroy the benefits of the adjustments.

Question: Will the new wage-price policy tie business men and labor unions up in red tape and delay?

Answer: Emphatically no. The government is obligated to give both groups the fastest possible action. The new wage-price program contains new provisions for streamlining procedures to the limit.

Question: What agencies will administer the new wage-price policy?

Answer: The same agencies which have been administering the previous policy. The National Wage Stabilization Board will pass finally on all applications for approval of wage increases, except those involving agricultural labor and so-called Lea Amendment cases. The board acts also on increases for certain salaried employees receiving $5000 per annum or less.

The salary stabilization unit in the Treasury Dept. will pass finally on all applications for approval of salary increases other than salary increases under the jurisdiction of the National Wage Stabilization Board. The Dept. of Agriculture will continue to administer wage controls applying to agricultural labor.

The Office of Price Administration will administer the price features of the new policy, with the approval of the Secretary of Agriculture as required by law in certain cases.

The Director of Economic Stabilization will direct and coordinate the over-all policies.

Wage Adjustments

Question: Can an employer lawfully make a wage or salary increase without getting government approval?

Answer: Yes. Under the new Executive order, so-called unapproved wage or salary increases are still lawful, with certain exceptions, just as they were before. However, wage or salary increases must be approved before they can be used as a basis for securing an increase in price or rent ceilings or utility rates or for increasing costs to the United States under government contracts. Unless approved, such increases cannot, for the duration of the stabilization laws, be considered for such purposes.

Question: Are there exceptions to the general rule that unapproved wage or salary increases are not unlawful?

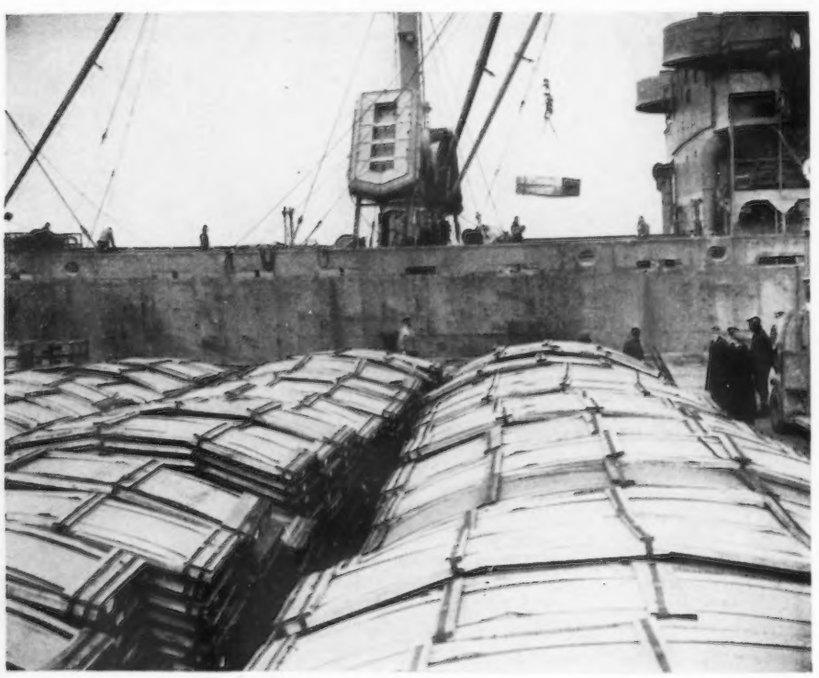
Answer: Yes. These exceptions are the same as those which existed before the new Executive order.

Question: If an employer makes a wage or salary increase without prior approval and gives notice that he has no present intention of using it as a basis for seeking a price increase, may he apply for a price increase later?

Answer: Yes. He must, of course, first secure approval of the wage increase. OPA will then consider his application for price relief, if he shows a reasonable ground for the change in his original intention. While employers are not prohibited from agreeing to absorb additional increases, it is important that any such agreement should be made with open eyes. Otherwise, widespread wage settlements might be made in excess of the standards for approval without awareness. This would create the dilemma of either imposing sever and often intolerable hardship upon employers in many cases, or permitting a break in the wage-price policy which would upset the stabilization program.

ED. NOTE: *The remaining questions and answers clarifying the Administration's wage-price policy will be concluded next week.*

HOUSING SHORTAGE: *Sections of surplus Quonset huts from a Naval base are being loaded upon a freighter for shipment to New York City in an effort to alleviate the acute housing shortage. Between 700 and 800 huts will be shipped.*



European Surplus Disposals Gain Despite Dollar Shortage

o o o

By JACK R. HIGHT

o o o

POLISH POSSIBILITY: *Representatives of most European countries are shopping with the Office of Foreign Liquidation, and many of them visit the largest depot, located just outside Paris. These Polish experts appear interested.*

Paris

• • • **Surplus declarations** in the European theater now approach the billion dollar mark, according to John C. Virden, central foreign liquidation commissioner for Europe. In contrast, sales to date in the theater are at about the hundred million dollar mark. Losses monthly due to pilferage now approximate $1,000,000, in France alone, making the disposal problem an urgent one if the American taxpayer is to get any of his investment back. Officials here estimate that losses in Belgium, where other large concentrations of stores are located are equally high.

The overall aspect of the disposal problem in Europe is colored by the fact that the supplies are located in depots, mostly in France and Belgium, where they must be guarded constantly and are subject to constant deterioration. The universal dollar shortage and America's policy of selling for dollars only puts the European states in the position where they are able to buy in limited quantities.

In addition, they have acquired the good business habit of being willing to wait for their own kind of bargain in what is undeniably a buyer's market. There is the feeling on the part of many Europeans that eventually, if no willing buyers appear, Uncle Sam must inevitably hand the key to the depots to whatever nation they may be located in, saying, "Brother, its all yours."

Contributing strongly to the development of this impression is the American Army's redeployment record. The Frenchman has seen the Yankee columns vanish from his country even more rapidly than they advanced upon it, and is impressed. Keenly aware that the wholesale evacuation still goes on, the European knows as well as does the OFLC that if the withdrawal continues there must come a huge firesale or an outright abandonment.

The redeployment program has actually hurt the disposal program from two directions, as the Army has been furnishing much of the personnel for the OFLC functions, and also has acted as the guardian of the supplies in depots. The Foreign Liquidation Commission has remained purely a sales organization, and at no time tries to physically handle any of the property. The Army declares surplus, inventories, warehouses, and eventually releases the material if a sale is consummated by the OFLC.

The net result has been that the skilled personnel who were accustomed to handling the material have returned to the United States, and the officers who were assigned to the sales group in OFLC have also been subject to replacement at the very time when an organization was being built up.

The redeployment program has also figured importantly in the delays noted in getting in surplus declarations from the forces. The sales activities start when the material is declared by either the Army or Navy, and one of the most important limiting factors on sales to date has been the absence of declarations.

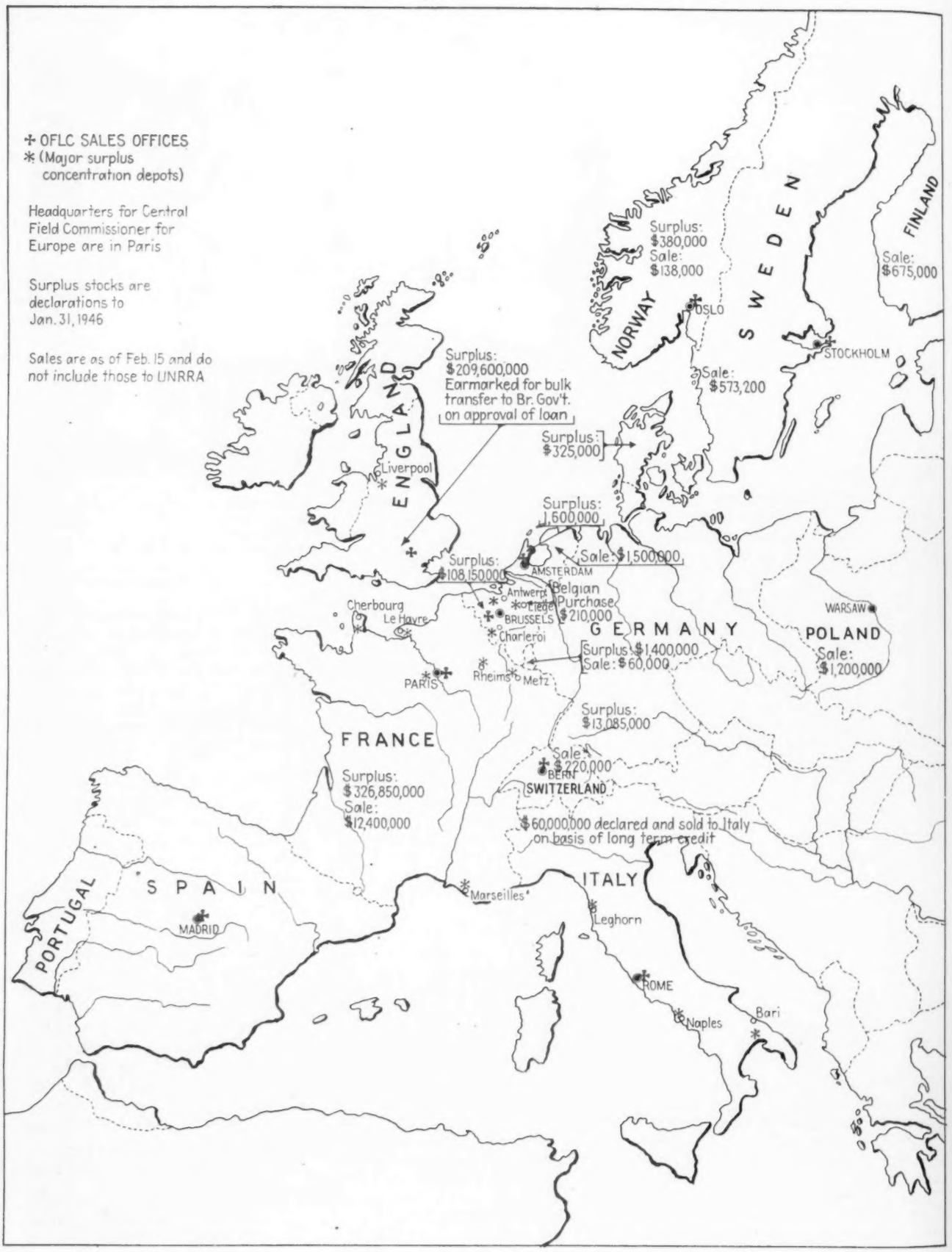
Mr. Virden told THE IRON AGE recently that more than half of the material declared surplus in the ETO to date was declared in January, and most of that in the last two weeks of the month.

After the material has been declared to the office of the commissioner in Paris, his sales organiza-

(CONTINUED ON PAGE 118)

Ed. note—On the following pages a map locating the various surplus depots and types of foreign surplus products are illustrated.

Location of Surplus Supply Depots and OFLC Stations



War Surpluses Fill Peacetime Niche

AMONG THE WEALTH *of goods held by the Office of Foreign Liquidation in Europe are refrigerators originally destined for Army hospitals, stocks of steel sheets and 25,000 assorted vehicles. To guard these treasures prisoner of war labor is being widely used to replace deployed American soldiers. The center illustration shows a French inspector examining steel sheets before delivery. Despite cautious buying on the part of the French government toward most surplus goods, sheets have been snapped up. The vehicles in the bottom picture are stored at the Vincinnes race track just outside Paris. The OFLC is making a gallant effort to sell as many as possible but many will probably become scrap.*

(CONTINUED FROM PAGE 115)
tion takes over the responsibility for getting as many as possible of the taxpayer's dollars out of it. The sales group is divided into maritime, consumer goods, aircraft and fixed installations, according to the items they handle.

From inventories furnished by the Army the sales group arranges the goods into special offerings of related items, and lists the offerings in a prospectus describing their condition, as well as an appraisal price. The prices are set by an appraisal group upon the basis of a formula developed by the American Appraisal Co. and Stone & Webster last year. They are considered only as a general guide, and prospective buyers may bid lower if they wish.

After the listing of the special offering has been made, it is sent out to all the field representatives of the OFLC to attract purchasers. At the present time there is a field commissioner in Italy for Italy and Africa, one in Stockholm for Sweden and Finland, one in Oslo for Norway and Denmark, one in the Netherlands, one in Brussels for Belgium, one in Bern for Switzerland, one in Madrid for Spain and Portugal, and one in Paris for France.

These representatives work closely with the American diplomatic representatives in their respective countries, as well as with the official government agency that handles surplus purchases in each country. The ever present threat of such huge supplies of scarce materials finding their way into black markets has made it advisable for most European countries to forbid individuals in their own states to enter into any surplus purchases.

In the place of individuals, the governments themselves have set up special departments to entertain such purchases, and have bought with varying degrees of enthusiasm. The precise reasons for the general caution in buying, as differentiated from the stated reasons, are difficult to analyze with any degree of certainty. A major complaint raised is that America is demanding dollars in payment from countries that have no dollars.

Steps are being taken in Washington to ease the situation with the negotiation of loans to permit the several European countries to buy surplus goods. Transitional efforts have been made to accomplish the same end, in the form of an offer from the United States to all the countries that they could buy certain amounts of surplus payable in their own local currency. The stipulation was added that the rate of exchange was to be opened for negotiation at a later date for the currency so acquired.

Four countries, Finland, Norway, the Netherlands, and Italy accepted on this basis, and are now buying under the limits so imposed. Even these countries, however, are buying with extreme caution only goods desperately needed. The whole question of the urgent needs of this winter is one that will have great effect on the future sales of all the surpluses.

The great attractiveness of the material as a whole has been that it is available on the spot at a time everyone must wait for the delivery of new materials. Most of the supplies available are not too well adapted to the needs of peacetime, but would be salable only as a substitute for new goods.

It seems likely then that the sales that we are able to consummate in the first half of this year will be the only ones we can hope to get much above scrap prices for. When June arrives the winter desperation will be a matter of memory to those still alive, new goods will be appearing in domestic markets, and British and American manufacturers will be vying with each other in clutching at the market, advising all customers to wait for new goods.

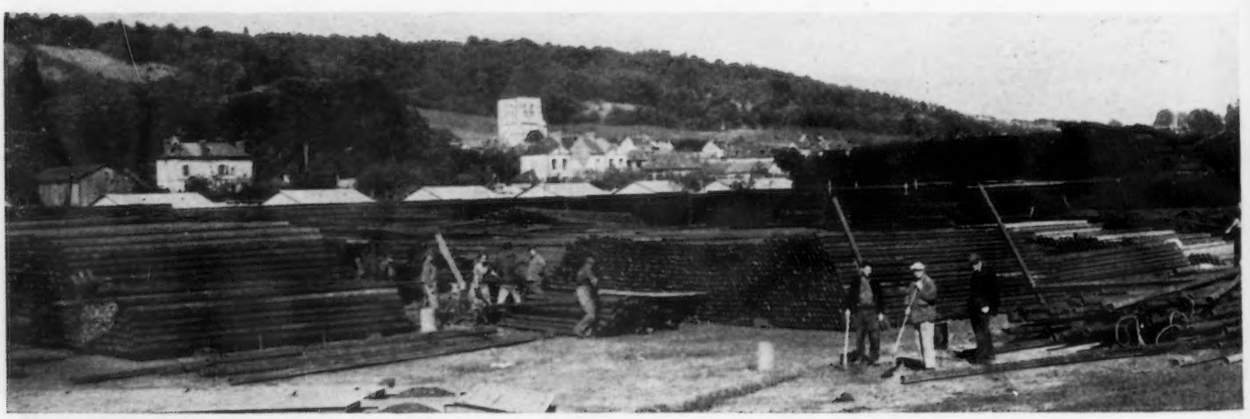
With the urgency of the sales work apparent, every delaying factor in the process becomes more costly. Despite the fact that all of the complex priority clauses in the Surplus Property Act are not applied on foreign sales, even the arrangements for disposals to soldiers and veterans in Europe become a time consuming job. Although from a volume standpoint, largely an academic issue, the OFLC is seriously working at giving each GI and ex-GI remaining in Europe his rightful opportunity to buy the goods he wants.

The international transport picture is also affecting the progress of disposals, as the general policy amounts to sale "as is, where is." Officials in the commissioners staff indicate that sales have been lost because a government was unable

(CONTINUED ON PAGE 157)

o o o

NO PIPE DREAM: *This new and used 4 and 6-in. lightweight welded steel pipe in 20-ft lengths is stored at Engineer Depot E 517 at Alizay, France. This pipe had been utilized in the pipelines in France that fed oil and gas to the advancing armies. When declared surplus the equipment will be sold in Europe by the Foreign Liquidation Commissioner.*



Weekly Gallup Polls . . .

OPA Receives Enthusiastic Public Support

• • • **Although price ceilings** and the OPA have been bitterly criticized by many manufacturers, businessmen and farm groups, their viewpoint does not seem to be shared by the great majority of the people, according to George Gallup, director, American Institute of Public Opinion.

In a coast to coast survey more than 200 interviewers for the institute gathered the opinions of voters in all economic levels and found that (1) the majority feel the OPA has done a good job, and (2) there is a heavy vote in favor of continuing the price control act which would expire in June.

The feeling that price controls should be extended prevailed among a majority of rank and file Republicans, as well as Democrats. Republicans are 2 to 1, Democrats 3 to 1 in favor of extension of the price ceiling law.

The vote of the public on extending the Price Control Act, a program recently advocated by Chester Bowles, is as follows:

"The present price ceiling law ends in June. Do you think the price ceiling law should be continued or should it end in June?"

	Pct
Continued	73
End in June	21
No opinion	6

Polls during the war found the voters in favor of continuing wage control as well as price control—a step which some economists feel is essential to prevent full inflation. In short, the public showed itself willing to accept some sacrifice in the way of curbing wage increases, if the government showed itself determined to maintain price ceilings.

Opinion on the issue was also tested last August, at the time of the end of the war.

It was then found that 74 pct wanted price controls continued and that 62 pct were also willing to have wage ceilings continued.

The combined program of wage-price control is something which the general public favored all through the war. In fact, the majority of voters polled in the early days of the war favored the step a full year before Congress passed a wage-price control bill. A bill which limited prices but did not curb wages was passed first. At that time three-fifths of the voters polled by the institute indicated their willingness to go a step farther and accept wage ceilings. Approximately 1 yr later the wage ceiling program was put into effect.

The country's views on the OPA itself are shown by the responses to the following question:

"What kind of a job do you think the OPA has done?"

The opinions expressed fall into the following general categories:

	Pct	
Fair, fairly good	40	80
Excellent job, very good	40	
Poor job	13	
No opinion	7	

It would appear from the above that complaints made by manufacturers and others about OPA, however justified in the eyes of the complainants themselves, do not reflect general public sentiment and have not aroused much public sympathy as yet.

All major population groups favor continuing the price control act beyond its present expiration date. White collar workers vote 5 to 1 for extension, the poll shows, professional and business men 3 to 1, manual workers 3 to 1, and farmers 2 to 1.

This survey had just been completed when Mr. Bowles left the OPA to take up his other duties on the inflation front. Among persons who could identify Bowles as head of OPA, three out of four liked the way he handled his job.

•

Parallel studies in Britain and this country on the proposed British loan bring to light interesting differences in the interest and attitudes toward the issue in the two countries.

In England, interest in the loan runs much higher than in this country, with 72 out of every 100 included in a survey there declaring they have been following discussions about the loan.

A similar survey in this country finds only 57 in every 100 among the voting population declaring they have been following the discussions.

On the matter of approval or disapproval, while opponents of the loan in this country can point to the fact that the weight of opinion among those following the discussions is not in favor of the proposal, those who do favor the loan can point to the fact that the more a person knows about the loan, the more he is inclined to favor it.

When the vote in this country is broken down by education groups, college-trained persons surveyed approve the loan to Britain by a substantial majority, in contrast to those with an elementary school education or less, who disapprove the loan by about a 2 to 1 vote.

In Britain, where the question of accepting or rejecting the loan was hotly debated in Parliament, the British public by a majority of 3 to 1 approves accepting the loan.

The questions both here and in Britain were limited to those who say they have followed discussions about the loan.

The question in the United States:

"Do you think Congress should or should not approve the loan?

The replies:

	Pct
Should approve loan	22
Should not approve loan	29
Undecided	6
	57

Favors Congressional Action To Extend Price Control Act; Majority Oppose British Loan

(CONTINUED ON PAGE 161)

CFI Official Killed In Head-On Collision

Pueblo, Colo.

• • • **Louis F. Quigg,** 56, executive vice-president of Colorado Fuel & Iron Corp., died Feb. 26, shortly after an automobile accident near Palmer Lake, Colo.

R. M. Sievers, district sales manager for Harbison-Walker Refractories Co., riding with Mr. Quigg and three others, met death in a head-on collision.

Mr. Quigg had been active in the steel industry for 40 yr first with predecessor companies of Bethlehem Steel Corp. subsidiaries, and since 1928 with CFI which he joined as general superintendent. In 1938 he was promoted to vice-president in charge of operations and has been executive vice-president since last year.

A. F. Franz, formerly superintendent of the Buffalo plant of Wickwire-Spencer Steel Div. of C. F. & I., has been placed in charge of Colorado operations with the title of works manager, taking over this portion of Mr. Quigg's duties. J. D. Sullivan will have charge of steel products sales with the title of vice-president and general sales manager, steel division. Mr. Franz was associated with Alan Wood Steel Co. before joining Wickwire-Spencer last year.

Calls Continued Price Controls Unnecessary

Washington

• • • **Immediate removal** of price controls on capital goods was urged on Mar. 12 by William J. Kelly, president of the Machinery & Allied Products Institute. Appearing before the House Banking & Currency Committee at a hearing to extend the Price Control Act, Mr. Kelly declared that continued price control over machinery and industrial equipment not only is unnecessary in peacetime but it defeats the major objectives of the stabilization program. Lifting of price control, he said, would expedite a return to volume, low-cost production which, he pointed out, is the best known antidote to inflation.

Mr. Kelly, who is president of the Kelly Steel Works, Inc., Chicago, declared the peacetime industrial plant was badly undersupplied with modern, efficient equipment at the beginning of the war as an aftermath of the depressed conditions in the thirties. Manufacturers of all types of civilian goods are currently in the market for the latest and most efficient production machinery. These requirements, he explained, must be met if the industrial plant is to be physically capable of delivering volume production needed to checkmate inflationary forces.

Industry, declared Mr. Kelly, looks to more efficient machinery as the most important means of offsetting the major rise in manufacturing costs which have taken place. He also pointed out that technologic progress operates to reduce unit costs and to make possible a low-price economy despite the long-term upward trend in wages. He declared that there is growing evidence that price control retards technologic progress and stifles development and production of entirely new types of machinery that would further reduce manufacturing costs or produce better goods.

New Salvage Drive

Washington

• • • **The Civilian Production Administration is getting underway a nationwide scrap drive, designed to bring in 2,000,000 additional tons of scrap within the next 4 to 6 months. The drive will be aimed at small manufacturers principally.**

A house-to-house campaign, such as that undertaken during the WPB drive, is also under consideration.

It is estimated that the current monthly scrap deficit is between 500,000 and 600,000 tons, and according to CPA, pig iron supplies will not be able to handle the increasingly heavy furnace requirements, should scrap supplies continue the downward trend. Cast iron scrap is also critical.

From an estimated 5,600,000 tons at the height of the WPB drive in mid-1943, the scrap stockpile had dropped to about 3,000,000 tons at the end of the war. It has been declining steadily ever since. An additional 2,000,000 tons is needed to bring supplies back into balance.

Details of the drive have not been worked out, but CPA told THE IRON AGE that particular emphasis will be laid on getting scrap out of the hands of small manufacturers.

G. M. Laughlin, Jr., Dies

Pittsburgh

• • • **George McCully Laughlin,** a member of the board of directors and the executive committee of Jones & Laughlin Steel Corp., and formerly the chairman of the board of the company, died Saturday, Mar. 9, in his winter home at Lake Wales, Fla. Mr. Laughlin was a grandson of James Laughlin, partner in the original firm of Jones & Laughlin, Ltd.

For many years he was connected with the operating end of the company and for some time was superintendent of the Soho Works. He was elected vice-president and director in 1923 and was chairman of the board from 1928 to 1936.

Plans Complete For New Steel Industry

Vancouver, B. C.

• • • **Plans are said** to be nearing completion for the establishing of a new Canadian steel industry in British Columbia. The new project is sponsored by the B. C. Minerals & Resources Development Co., and Privateer Mines Ltd., of Vancouver, and will be under the direction of D. S. Tait, president of both companies.

The site of the new industry is Onyox, B. C., an abandoned copper, gold and silver producing town, the town and hydroelectric plant being purchased from Consolidated Mining & Smelting Co., with all dockage and shore rights for $130,000. The initial unit planned is an electric furnace of 7500 kva, and the entire plant will be designed by a Swedish engineer.

Iron ore will be brought from Texada Island deposits, which is said to be high grade magnetite, low in phosphorus and when reduced by the electric process will make an iron of a quality not produced elsewhere in North America, it is stated. It is claimed it will be comparable to Scandanavian iron.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1946

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
† January	3,530,050	51.1	207,512	47.4	131,514	28.1	3,869,076	49.6	873,381	4.43
† February	1,265,561	20.3	25,905	6.6	62,208	14.7	1,353,674	19.2	338,418	4.00
March										4.43
1st Quarter										*12.86*
April										4.29
May										4.43
June										4.29
2nd Quarter										*13.01*
1st 6 months										*25.87*
July										4.42
August										4.43
September										4.28
3rd Quarter										*13.13*
9 months										*39.00*
October										4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1945

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
February	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
March	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,947	4.43
1st Quarter	*19,364,034*	*93.3*	*1,124,640*	*77.6*	*1,080,103*	*80.2*	*21,568,777*	*91.6*	*1,677,199*	*12.86*
April	6,541,097	94.4	372,952	77.2	377,877	84.1	7,291,926	92.8	1,699,750	4.29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,939	4.29
2nd Quarter	*19,333,940*	*92.1*	*1,154,859*	*78.8*	*1,097,169*	*80.6*	*21,585,968*	*90.6*	*1,659,183*	*13.01*
1st 6 Months	*38,697,974*	*92.7*	*2,279,499*	*78.2*	*2,177,272*	*80.4*	*43,154,745*	*91.1*	*1,668,139*	*25.87*
July	6,318,463	88.6	381,832	76.7	286,713	61.9	6,987,008	86.3	1,580,771	4.42
August	5,171,925	72.3	347,088	69.5	217,363	46.9	5,736,376	70.7	1,294,893	4.43
September	5,435,358	78.7	352,847	73.2	195,156	43.5	5,983,361	76.3	1,397,982	4.28
3rd Quarter	*16,925,746*	*79.9*	*1,081,767*	*73.1*	*699,232*	*50.9*	*18,706,745*	*77.8*	*1,424,733*	*13.13*
9 months	*55,623,720*	*88.3*	*3,361,266*	*76.5*	*2,876,504*	*70.4*	*61,861,490*	*86.6*	*1,586,192*	*39.00*
October	5,146,370	72.0	242,122	48.5	209,290	45.1	5,597,782	69.0	1,263,608	4.43
November	5,640,850	81.5	358,664	74.2	201,866	44.9	6,201,380	78.9	1,445,543	4.29
* December	5,522,829	77.4	343,266	68.9	192,704	41.7	6,058,799	74.8	1,370,769	4.42
* *4th Quarter*	*16,310,049*	*76.9*	*944,052*	*63.8*	*603,860*	*43.9*	*17,857,961*	*74.2*	*1,359,053*	*13.14*
* *2nd 6 months*	*33,235,795*	*78.4*	*2,025,819*	*68.5*	*1,303,092*	*47.4*	*36,564,706*	*76.0*	*1,391,881*	*26.27*
* Total	71,933,769	85.5	4,305,318	73.3	3,480,364	63.7	79,719,451	83.5	1,528,950	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,614,338 net tons open hearth, 112,658 net tons Bessemer and 104,640 net tons electric ingots and steel for castings, total 1,831,636 net tons; based on annual capacities as of January 1, 1945 as follows: Open hearth 84,171,590 net tons, Bessemer 5,874,000 net tons, Electric 5,455,890 net tons, total 95,501,480 net tons.

SAE Papers Indicate German War Materials Inferior to Our Equipment

Detroit

• • • **German war** equipment, while demonstrating great ingenuity in many respects, did not measure up to our own in practically all categories. This was the consensus of a series of papers read at a German Engineering Evaluation meeting of the Society of Automotive Engineers held in Detroit recently. Authorities in and out of uniform discussed various phases of the German war endeavor, as gleaned from on-the-ground study of enemy equipment.

For instance, in the minds of Hitler, Speer and others influenced by a love of the grandiose were hatched out plans for super-heavy tanks, the most spectacular being a 1500-ton job blueprinted at Krupp. According to Lt. Col. C. H. Corey of Ordnance, who described these land Goliaths, the project was dropped when it developed that the weight would be actually 300 tons more than had been anticipated and so, apparently, impractical. This tank would have mounted an 800 mm gun as main armament. Other tanks were designed to weigh from 100 to 200 tons, but tank specialists in Germany opined that the weight of a tank should not exceed 80 tons at the outside.

A paper by Maurice A. Thorne of General Motors Corp. revealed the interesting fact that toward the end of the war research in Germany for power plants for tanks and other motorized equipment was leaning in the direction of aircooled diesel engines. These would have the advantage of burning coarse fuel, German gasoline supplies being what they were, and of also being usable on the very cold fronts in Russia.

In their orthodox cooling systems, according to F. M. Young of Young Radiator Co., German engineers had given good thought to ingress and egress of air, but had not progressed to the point of thermostatic temperature control. One interesting development in this field was the assembly of aluminum radiators for aircraft, done with the atomic hydrogen arc welding process, developed to a high and excellent degree.

Tank transmissions, as reported by Lt. Col. Ewen McEwen, of the British Ministry of Supply, were built within a monopoly held by the Friedrichschafen combine of Zahnradfabrik Friedrichschafen, and Maybach. This apparently caused an inbreeding of design and led to lack of progress. Said this speaker: "All through the designs show complexity, lavish expenditure of manhours, first-rate workmanship and extremely ingenious detailed design, but an apparent inability to use simple means to an end." He reported that all tank gearbox gears were ground and that there appears to have been no knowledge of shot peening or the possibilities of improving fatigue life by elimination of grinding.

In a general survey of transmission systems by R. R. Burkhalter of Spicer Mfg. Co. it was stated that gearboxes used in trucks and half tracks were of conventional design, but that full track vehicles enjoyed unusual features to improve maneuverability and ease of handling. Little development work was found on clutches. Certain torque converters were deemed satisfactory, and universal joints were conventional. Very little development work on axles were noted, and brakes were generally of conventional American or European prewar design.

Tires for motorized vehicles were made of an inferior type of rayon yarn, it was stated by Earl W. Glen of the Rubber Div. of the Civilian Production Administration. In a 30 pct overload test, he reported, no German tire ran more than 4000 miles, a level considerably below the average for American made synthetic tires.

By contrast, German autobahns were said by John W. Wheeler, of Burlington Lines, to be comparable in almost every respect with our own limited access highways. Surfaces, entry and egress, grading and other attributes were characterized as excellent.

"Okay—they're sticky and messy—but if there's no dried egg we gotta use 'em."
—by Neb.

Transatlantic Daily Mail

Price Rise Method Set For Malleable Castings

Washington

• • • **A procedure under** which producers of malleable iron castings may increase wages and apply for and receive adjustment in ceiling prices (where necessary because of the wage action) within a week, has been announced by OPA.

Where a seller of malleable iron castings has granted an approved wage increase since Aug. 18, 1945, and seeks an increase in maximum prices because of that fact, he may file an application in triplicate under Section 1421.107 of MPR 241 with the Metals Price Branch, setting forth only the following:

(1) Name and post office address of applicant;

(2) Profit and loss statement for the third quarter, 1945;

(3) Percentage wage increase computed on total pay roll for third quarter, excluding salaries of executives.

(4) Attach copy of approval of Wage Stabilization Board of wage increases instituted.

It was pointed out, however, that OPA would still use the ability of the company to absorb the wage increase as the primary factor in determining the measure of maximum price increase; if dissatisfied with the granted increase, an appeal may be made by applying through standard procedure.

OPA Must Refigure Reconversion Formula to Include Increasing Costs

Washington

• • • **OPA plans to apply** the new wage-price policy to reconversion industries were discussed on March 7 when officials of OPA met with 23 chairmen of advisory committees representing industries which were wholly or substantially out of production during the war period.

The OPA position with respect to the reconversion formula which is applied to arrive at ceilings on reconversion products was outlined by Griffith Johnson, assistant director of the Consumer Goods Div. There is no change, he said, in the basic formula, which allows for 1941 costs, adjusted to allow for legal increases in basic wage rates and materials price increases. The basic change, he pointed out, is that the new wage-price policy permits OPA to give immediate consideration to current material cost increases and to wage increases approved by the National Wage Stabilization Board. The present task, Mr. Johnson said, is to recalculate the reconversion formula, with relation to particular industries, to take into account approved wage increase and increase in the general level of materials costs resulting from the new wage-price policy.

The method to be followed, Mr. Johnson said, is to bring industry surveys which resulted in earlier announcements of "increase factors" for particular products up to date. Members of each reconversion will be quickly contacted by OPA asking for up-to-the-minute information on approved wage increases which have been granted.

The application of the steel price increase as well as increases in the cost of other materials will be substantially the same as that reported in THE IRON AGE, Feb. 21, pgs. 95 and 96. Since OPA already has information concerning materials price increase it will be able to act quickly in recalculating materials increase factors once it has up-to-date wage information.

At the meeting's conclusion, industry members present strongly urged that OPA abandon its "philosophy" which looks toward increased labor productivity in the production of civilian goods. One industry representative said that on the basis of seven-months' operating experience, it is believed that his industry can expect that labor productivity during the next few months, compared with prewar turnout, will not go higher than 80 pct.

"Last July," he said, "the theory of increased labor productivity probably was an admissible one. But now it is no longer an academic question. After seven months, our industry is getting not more than 50 pct of prewar productivity. It is just too much to expect that men who for four years have forgotten how to work will come back and immediately produce goods in greater volume than ever before."

Industry representatives also recommended that OPA give consideration to allowing total costs in recalculating the reconversion formula, to include such items as "fringe" wage increases, salary adjustments, and increased overhead expenses.

Industries represented at the meeting covered the following reconversion products: metal furniture, bed springs and mattresses, mechanical refrigerators, vacuum cleaners, electric ranges, washing machines, typewriters, office machines, stoves, utensils, bicycles, small electrical appliances, lawnmowers, radios, clocks and watches, and flatware.

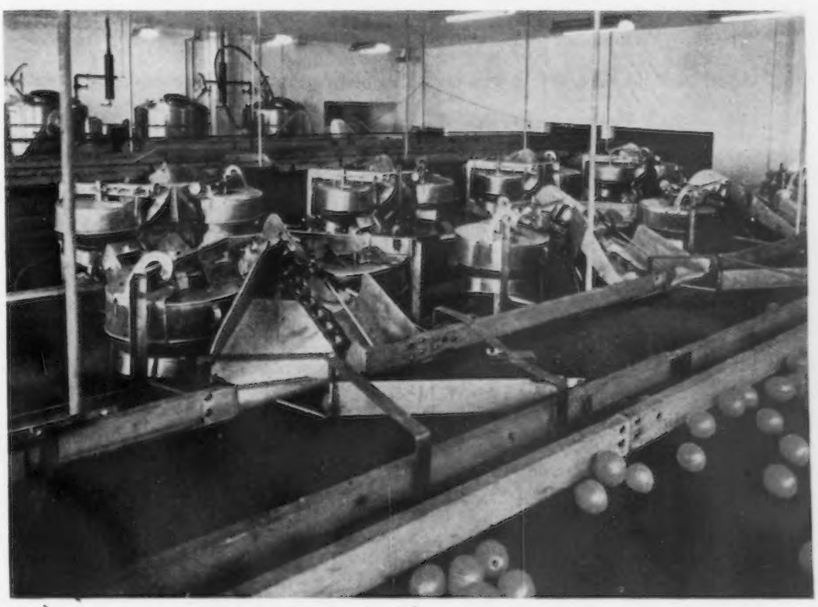
Great Northern's Income Dips 5 Pct at Year-End

St. Paul

• • • **Great Northern Iron Ore** Properties shipped 8,877,000 tons of iron ore during 1945, according to their annual report to trustees. In 1944, 10,954,000 tons were shipped.

Consolidated distributable income, before depletion charges, for 1945 amounted to $2,244,239.26 compared to $2,373,648.53 for the previous year. Income and excess profits taxes accrued in 1945, payable in 1946, was $1,084,046.28 as compared to $1,505,810.25 for similar accruals of the preceding year. A distribution of $2,250,000, equal to $1.50 per share on certificates of beneficial interest was paid Dec. 27, 1945.

STAINLESS SQUEEZERS: *Oranges are automatically cut through the middle by a stainless steel knife in these stainless juice machines. The halves come in contact with a spinning reamer which extracts the juice.*



Shipbuilding Industry In Canada Plans Busy Program Through '47

Montreal

• • • **The Canadian** shipbuilding industry, which attained record proportions during the war years, is not to be scrapped. It is estimated that the shipbuilding industry now has orders on hand or in prospect to a total value of approximately $300,000,000, or sufficient to keep most of the leading plants busy through the greater part of 1947.

It is announced that the French Supply Mission has placed contracts with three Canadian yards for ships to the value of $45,000,000 and orders for a similar sum are pending from the same source. It also is reported that orders involving $75,000,000, for ships and fittings, are pending from the Chinese Government.

French orders placed include, 10 colliers costing $17,000,000—five of 5000 tons and five of 7500 tons to be powered by Parsons turbines built by John Inglis Co., Toronto, awarded to Burrard Dry Dock Co., North Vancouver, B. C.

Four colliers to be built by George T. Davie & Sons, Lauzon, Que.

Four colliers of 7200 tons and 15 fishing trawlers to be built by Marine Industries Ltd., Sorel, Que.

The contracts were negotiated direct between the companies and the French authorities and not through the Canadian Government.

Canadian shipbuilders now have on order steel ships and repair contracts totaling $105,000,000; private orders from domestic sources and for export amounting to $25,000,000, with $20,000,000 orders pending; and additional orders from France and China pending valued at $120,000,000.

It also is announced that Dominion Bridge Co., has entered into an agreement with the French Government for construction of 80 barges to be used in French-Indo-China and another contract is said to be pending with the same source for barges to be used on the Rhine River. The barges for Indo-China will be built by the company in Vancouver and will have a value of $700,000. The barges for Europe will be more expensive as they will be self-propelled, and participation of Montreal yards is expected. Steel fabrication work will be done by the Dominion Bridge Co., Montreal plant.

Coming Events

Mar. 20-22 Chicago Technical Societies Council, production show and conference, Chicago.
Mar. 25-26—American Machine Tool Distributors' Assn., Chicago.
Mar. 29-30 American Gas Assn., conference on industrial and commercial gas, Toledo.
Apr. 2-5 American Management Assn., packaging exposition, Atlantic City, N. J.
Apr. 3-5 Society of Automotive Engineers, national aeronautical meeting, New York.
Apr. 8-12 American Society of Tool Engineers, annual convention and exposition, Cleveland.
Apr. 10-13 Electrochemical Society Inc., spring congress, Birmingham.
Apr. 22-27 National Plastics Exposition, New York.
Apr. 25-26 American Institute of Mining and Metallurgical Engineers, openhearth and blast furnace and raw materials conferences, Chicago.
Apr. 29-30 National Welding Supply Assn., bi-annual convention, Dayton.
May 6-7 Assn. Iron & Steel Engineers, spring conference, Chicago.
May 6-10 American Foundrymen's Assn., golden jubilee convention and exposition, Cleveland.
May 29-31 Machinery Dealers National Assn., Atlantic City, N. J.
June 2-7 Society of Automotive Engineers, summer meeting, French Lick, Ind.
June 3-5 American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va.
June 13 Metal Powder Assn., spring meeting, New York.
June 17-18 American By-Product Coke Institute, first annual meeting, Seaview Country Club, Absecon, N. J.
June 24-28 American Society for Testing Materials, annual meeting, Buffalo.

Wallace Plans to Aid Standards Development

Washington

• • • **While urging the American** Standards Assn. and other business groups to expand their activities in developing and promoting voluntary trade standards, Commerce Secretary Wallace has disagreed with the recommendation of his policy committee that the department withdraw from the field.

Disclaiming desire to compete with or to duplicate service of private agencies, in a letter to Committee Chairman Charles E. Wilson, Wallace declared that to follow the committee recommendation would, in effect, be in violation of a "statutory responsibility of the department to provide such service in the interests of business and industry" and thus "close the door to industry and other economic groups" requesting such assistance.

Wallace, however, welcomed the recommendation that the divisions of simplified trade practices and commercial standards be transferred out of the Bureau of Standards.

Weirton Plans 50 Pct Tinplate Expansion

Weirton, W. Va.

• • • **An increase in tinplate** productive capacity of Weirton Steel Co., subsidiary of National Steel Co., is anticipated during the coming year, and will amount to approximately 50 pct of its present capacity. Present capacity consists of about 372,650 tons of hot dipped plate and 636,250 tons of electrolytically coated plate. To increase the output of tinplate, the company has already installed four annealing furnaces and 12 bases, representing a 20 pct expansion, and improvements are being completed on the third of the company's three 400 ft long electrolytic lines, each of which costs about $3,000,000.

Additional cold rolling capacity is being installed in the effort to increase tinplate output. The expansion of tinplate production is part of the $12,000,000 modernization program announced by the company after VJ-Day. It is anticipated that National Steel will expend $43,000,000 on future expansions and improvements.

Kaiser-Frazer Request Imposition Of Steel Allocation Controls Again

New York

• • • **At a press conference** here last week Henry J. Kaiser and Joseph W. Frazer stated that orders for sheet and other steel products for the Kaiser-Frazer automobiles were being refused by steel producers with the exception of Bethlehem Steel Co. and Inland Steel Co., the latter having indicated unwillingness to accept orders without similar action by other steel producers.

It was implied at the conference that the steel industry had combined against the Kaiser-Frazer interests because of its unilateral action in granting the wage increase requested by Kaiser's Fontana steel mill workers without awaiting the decision of the industry as a whole. Another reason for the unwillingness of steel producers to provide steel for the Kaiser-Frazer cars was stated to be the fact that producers preferred to make delivery to established customers before supplying new enterprises with currently limited steel supplies.

Both Mr. Kaiser and Mr. Frazer stated at the conference that their organization would be acceptable to having their requirements placed on steel order books for delivery in proper order. However, in the absence of acceptance of their orders both men considered that the subject was one which should be looked into by governmental authorities. If necessary, it was stated at the conference, it would be desirable to reimpose upon the steel industry allocation controls in order to permit all manufacturers to make use of available supplies of steel.

The Kaiser-Frazer plans for the production of automobiles with sheet aluminum bodies were brought up for discussion at the meeting. Mr. Kaiser indicated that delivery time for aluminum sheet was 14 weeks. He also stated that assuming unlimited steel sheet was available to the company it would go ahead with the plans for the aluminum bodied cars.

•

Washington

• • • **The first meeting** of the old WPB Iron and Steel Advisory Committee will be held by CPA on Mar. 27. Detailed agenda for the meeting has not been prepared. However, allocations, particularly to new users, highlighted by Henry Kaiser's claims, will no doubt be one of the main topics under discussion, according to CPA sources.

•

New York

• • • **The Kaiser blast** about his inability to obtain steel came as "one of those things" in the steel industry. All steel firms have, as far as humanly possible, according to reliable sources, meticulously tried to see that regular customers of long standing received a preference on their steel orders. This, it was said, represented an established attitude. Many firms, it was averred, which grew up in war times have been attempting to get steel over and above requests from "old customers."

The tempest in the teapot set off by Mr. Kaiser is not expected to mean that he will get any better delivery from steel companies than other customers who, because of their prewar standing, have been on steel books for months for steel which they have not received.

NLRB Rules to Extend Wagner Act Provisions To Supervisory Unions

Washington

• • • **Indication that the** recognition of supervisory employees' unions would provide a major point of controversy in the negotiations for a new soft coal contract was seen here following a ruling last week by the National Labor Relations Board.

In a 2:1 decision, the NLRB ruled that the machinery of the Wagner Act could not be denied unions of supervisory employees, even though such unions should elect to affiliate with a production union for collective bargaining purposes.

Informed sources said here that industry would fight the decision of the board to the Supreme Court, if necessary, agreeing with the dissenting member of NLRB, Gerard D. Reilly, that if this ruling were to be accepted "it is probable that we have seriously impaired the ability of the operators to effectively manage their mines."

The decision was handed down by the NLRB in the case of Jones & Laughlin Steel Corp. which owns and operates the Vesta Coal Co. and the Shannopin Coal Co. After the company refused to grant the United Clerical, Technical & Supervisory Employees Union of the Mining Industry (Div. of Dist. 50, UMW) collective bargaining recognition, the union petitioned the NLRB to conduct an election to determine whether it represented a majority of the company's approximately 190 supervisory workers.

The Board directed that two elections should be conducted within 30 days to poll the supervisory employees as to whether they wish to be represented by the UCT for the purpose of collective bargaining. One will be held among production and maintenance supervisory employees and the other among the clerical and technical group.

Eligible to vote in the elections, respectively, will be (1) fire bosses, mine crew foremen, assistant mine foremen, maintenance bosses, mechanical bosses, and (2) engineers, chief draftsmen, transitmen, chief supplies clerk, and chief supplies and assistant chief clerk.

Specifically held as ineligible to vote in each of the elections were mine foremen, general assistant mine foremen, tipple foremen, general master mechanic, mine superintendents, general superintendent, assistant general superintendents, director of industrial relations, chief of police, weighmasters, weighmasters' clerks, training supervisor, safety inspector and dispatchers.

Until last week, the NLRB had taken no position except in respect to supervisory employees which were unaffiliated with unions of the rank-and-file employees. This latest decision is seen by many as strengthening the hand of John L. Lewis in the coming negotiations. In his strike notice he stated that one of the questions he will raise is the "right of supervisory employees in the coal industry to be members of the UMW and to be covered by contract."

Industrial Briefs...

• To MERGE—William S. Jack, president of Jack & Heintz, Inc., Cleveland, has announced plans for the merger of that company with a newly formed Delaware corporation which will be known as Jack & Heintz Precision Industries, Inc.

He also pointed out that the company's personnel practices which helped so materially during the war to increase production and lower costs will be continued by the successor company with certain modifications to adapt them to peacetime operations.

Regarding these personnel policies and practices Mr. Milner stated: "The wartime production records of Jack & Heintz, Inc., show that the company's labor-management plan paid off in dollars and cents as well as in goodwill. Mr. Jack's method of dealing with workers was based on his own experience as a worker at the bench. His stimulating new ideas, from the management viewpoint, indicate the way to many unexplored methods of progressive development in employee education, training and understanding. These methods are no longer theoretical; they have been tried and proved successful during the war years. They not only resulted in increased production through the elimination of absenteeism and fatigue but they also resulted in lower cost per unit produced. It is planned to continue as many of these personnel practices as are consistent with the demands of peacetime production."

This announcement of a successor company to Jack & Heintz, Inc., Mr. Jack said, "may be considered the first step in a post-war expansion program which will enable our company to serve not only the aviation field but several other industries as well."

The new company will continue the production of airplane starters, generators and other aircraft products which it made during the war, and in addition its peacetime production will include fractional horsepower electric motors, ball and roller bearings, electronic gages and measuring devices, precision machine tools and other products.

At the present time the Cleveland plants of the company are employing some 1500 workers, Mr. Jack said, "but plans now under way for the acquisition of other companies and new products to increase peacetime opportunities are expected to bring about full utilization of all manufacturing facilities which we used during the war."

"These plans," he continued, "are directed toward bringing about a well-rounded out and well-balanced manufacturing and sales program through the development of special precision products and equipment not only for aircraft but for the automobile, refrigeration and air-conditioning industries as well."

• INDUCTION HEATING MOVIE—A 12 min. 16 mm sound movie entitled "Metal Magic" has been produced by Allis-Chalmers Mfg. Co., demonstrating uses of induction heating in surface hardening, annealing, brazing, soldering, and melting and heating for forging.

• EXPANSION—The small plant of Timken Roller Bearing Co. operated at Zoarville, Ohio, during the war is being enlarged and converted for grinding of roller bearings for mining machinery. Between 50 and 75 persons are expected to be employed eventually.

• NEW PLANT — Thermo-Dyne Co., Cleveland will build a $10,000 laboratory and heat treating plant, Dr. John Evens, head of the company, has announced.

• NEW TOOL PLANT—W. B. W. Tool Co., Dayton, recently purchased the former Gem City Boiler property and will spend $75,000 to enlarge and remodel it into a new factory addition 125 ft by 62 ft, which will be attached to existing two-story office building. Operations will be moved in about five months.

Establishes Export Sections to Aid Sale Of Surpluses Abroad

Washington

• • • **To aid exporters** to buy government surplus property for sale abroad, the War Assets Corp. soon will open export sections at Boston; Philadelphia; San Antonio, Tex.; San Francisco; Chicago and New Orleans. Such a section already has been established in the WAC New York regional office and within the WAC Washington office. The latter operates as liaison with the Dept. of State and other government agencies normally concerned with export matters in developing foreign markets and assists regional offices regarding export sales of surplus property.

WAC said that its regional offices will distribute reasonable quantities of materials, equipment and commodities to the export market, even when the supply available does not exceed the capacity of the domestic market. This will not be done, however, until requirements of priority claimants are satisfied. It was pointed out that many items of surplus property are claimed by these claimants. Federal, State and Municipal Governments, and nonprofit and tax-exempt institutions with preference to veterans.

Credits may be extended to exporters provided the financial position and business reputation of the exporter is satisfactory. Under certain circumstances, credit may also be extended by the Washington office of the War Assets Corp. to a foreign purchaser having an established branch office in the United States acting as purchaser and subject to the laws of this country.

Sales to representatives or agents of foreign firms temporarily in the United States on buying trips will be made only on a "dollar" cash basis. Direct sales will not be made to a person or firm located in a foreign country. Foreign purchasers in the United States temporarily for the purpose of purchasing surplus property will not be excluded from purchasing, however, if payment is made in cash "dollars" and the purchaser assumes the responsibility for purchase, shipping, etc.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

2000 Tons, Midland, Pa., building extension, Crucible Steel Co. of America, to Fort Pitt Bridge Works, Pittsburgh.

1250 Tons, Houston, Tex., hotel and apartment building, to Mosher Steel Co., Houston, through Stone & Webster, Boston, general contractor.

775 Tons, Midland, Pa., shop extension and stripper building, Crucible Steel Co. of America, to Fort Pitt Bridge Works, Pittsburgh.

433 Tons, Grand Coulee, Wash., nine hydraulic gate hoists for Grand Coulee Dam, Bureau of Reclamation, Denver, Spec. 1124, to McKierman-Terry Corp.

400 Tons, San Francisco, Matson Navigation Co. office building, through Swinerton & Walberg Co., to Bethlehem Pacific Coast Steel Corp.

300 Tons, San Benito, Tex., power station, Central Power & Light Co., to Mosner Steel Co., Houston.

150 Tons, Columbia City, Pa., state highway bridge, LR 1906-7 section 3A, to American Bridge Co., Pittsburgh.

130 Tons, Keswick, Calif., one 230-ton overhead traveling crane and one lifting beam for Keswick Power Plant, Bureau of Reclamation, Denver, Spec. 1143, to Cyclops Iron Works.

100 Tons, Detroit, addition to Fruehauf Trailer Co., West Side Branch, to R. C. Mahon Co.

• • • **Fabricated steel inquiries** this week included the following:

2000 Tons, Redondo, Cal., 120,000-kw plant for Southern California Edison Co., Stone & Webster Engineering Co., Boston, engineers.

1218 Tons, Caddoa, Colo., steel Taintor gate for John Martin Dam, U. S. Engineer Office, Albuquerque, N. Mex., Inv. W-29-005 Eng-46-30, to Apr. 9.

468 Tons, Redding, Calif., four gate hoists for Keswick Dam, Bureau of Reclamation, Denver, Spec. 1156; Watertown Arsenal, FOB Watertown, Mass., low bidder.

441 Tons, Keswick, Calif., structural steel for 230-kv switchyard and 230-kv transformer circuits, Keswick Power Plant, Bureau of Reclamation, Denver, Spec. 1160, bids under advisement.

400 Tons, Springfield, Mass., telephone exchange for Northeast Telephone & Telegraph Co.

400 Tons, Philadelphia, maintenance building for Gulf Oil Co.

392 Tons, Redding, Calif., four gate hoists of regulating gates in spillway at Keswick Dam, Bureau of Reclamation, Denver, Spec. 1116, bids under advisement.

250 Tons, Philadelphia, addition to Chilton Co. building.

200 Tons, Kelso, Wash., three separation structures, P.S.H. No. 1, MacRae Bros., Seattle, general contractors.

175 Tons, Philadelphia, dealership building for Alinel Realty Corp., Mar. 20.

100 Tons, Carneys Point, N. J., miscellaneous steel for E. I. du Pont de Nemours Co.

• • • **Reinforcing bar awards** this week included the following:

2500 Tons, Boston, building for John Hancock Insurance Co. to Truscon Steel Co., Boston.

1750 Tons, Hinton, W. Va., Bluestone Dam, through Dravo Corp. to Jones & Laughlin Steel Corp., Pittsburgh.

850 Tons, Stockton, Calif., additions to Stockton State Hospital, through H. Mayson, Los Angeles, to Soule Steel Co.

300 Tons, Concord, N. H., Rumford Press expansion to Fabricated Steel Products Co., Boston.

300 Tons, Kerns, Va., National Gypsum Co. lime kiln plant, through George A. Fuller Co. to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Akron, Ohio, B. F. Goodrich Co., Batson Cook Co., contractors, to Truscon Steel Co.

150 Tons, Rochester, Minn., Rochester Dairy Cooperative plant, to Ceco Steel Products Corp., Omaha, Neb.

100 Tons, Skokie, Ill., addition to G. D. Searle & Co. plant, to Concrete Steel Co., Chicago.

• • • **Reinforcing bar** inquiries this week included the following:

2700 Tons, Cartersville, Ga., Altoona Dam for U. S. Army Engineers, bids due Apr. 2.

1300 Tons, Kansas City, Mo., flood wall; bids to U. S. Engineer.

1233 Tons, Cincinnati, Mill Creek Floodwall, not settled.

1225 Tons, Elmira, N. Y., flood control project; bids to U. S. Engineer.

750 Tons, Plymouth, Wis., Bowman Dairy Co., plant.

600 Tons, Lincoln, R. I., race track.

568 Tons, Mountain Home, Ida., miscellaneous reinforcing bars, Bureau of Reclamation, Denver, Inv. 22,669-A-1, bids due Mar. 19.

550 Tons, Greenwood County, Kans., Fall River Dam.

515 Tons, Frankfort County, Ky., state highway work.

500 Tons, Wister, Okla., dam; bids to U. S. Engineer.

350 Tons, Minneapolis, Northrup King & Co., building.

312 Tons, Friant, Calif., miscellaneous reinforcing bars, Bureau of Reclamation, Denver, Inv. A-48, 763-A, bids due Mar. 19.

300 Tons, Zion, Ill., Zion Industries, Inc., building.

266 Tons, Westmoreland County, Pa., R. 187, Sec. 8-A.

203 Tons, Lackawanna County, Pa., R-168, Sect. 11-B.

150 Tons, Kansas City, Mo., J. C. Nichols Co., building.

150 Tons, Chicago, Dryden Rubber Co., building.

135 Tons, Dayton, Ohio, Talbott Building addition.

120 Tons, Central Valley Project, Calif., Oroville-Sacramento transmission line, Bureau of Reclamation, Denver, Spec. 1152, H. H. Walker Co., Los Angeles, low bidder.

100 Tons, Beaver Dam, Wis., Phoenix Hosiery Co., plant.

Bar Fabricators To Pass Along Increase

Washington

• • • **Fabricators** of concrete reinforcing bars were authorized by the Office of Price Administration recently to pass on to their customers the dollar-and-cent amount of increase in the basic steel mill prices authorized Mar. 1 for the bars. This action became effective Mar. 7, 1946.

Fabricators covered by the action are those who buy concrete reinforcing bars and shape them into forms suitable for use in the reinforcement of concrete in building and highway construction.

OPA said an examination of all available information obtained from the industry indicated that the fabricators cannot absorb the mill price increase of Mar. 1 without financial hardship.

The mill price increases which may be passed on are as follows: Concrete reinforcing bars, 20¢ per 100 lb; spirals manufactured from bars, rods, or wire, 15¢ per 100 lb; welded stirrups, 30¢ per 100 lb. The extra for cold-drawn wire spirals is increased to 65¢ per 100 lb from 50¢.

"Today's 'pass through' of the mill price increase to buyers of prepared fabricated concrete reinforcing bars by fabricators will result in slightly higher costs of building and highway construction projects," OPA said.

"However," the price agency added, "the increase in cost of bars prepared for use by established fabricators with efficient preparation facilities will not be as great as would be the case if contractors and other users purchased unprepared bars direct from steel mills or warehouses, and prepared them for use themselves."

Places Plant Contract

Dearborn, Mich.

• • • **A contract for** construction of the new East Coast Lincoln and Mercury automobile assembly plant has been awarded to the Wigton-Abbott Corp., Plainfield, N. J. The new branch will be known as the Metuchen (N.J.) assembly branch and will be on Route No. 1 about four miles northeast of New Brunswick and one mile west of Metuchen.

Covering an area of approximately 78 acres, the new property will have an assembly plant 470 ft wide by 1040 ft long, an office building, a power plant, a test track for newly assembled cars, and a six-acre parking lot with a 1200 car capacity. It will employ an estimated 2500 people in its various departments.

MACHINE TOOLS

. . . News and Market Activities

See Spotlight on Surplus Machine Tools

Cleveland

• • • **Extended delivery** conditions in the machine tool industry may serve to bring government-owned surplus machine tools into the buyer spotlight, according to competent observers here.

With some half dozen builders' plants tied up with strikes, and a considerable segment of the industry idling for want of antifriction bearings and electrical equipment, customers normally on the market for new equipment may be forced in some cases to buy surplus tools in order to get into production.

This situation, while still in the incipient stage, is not reflected by the current figures covering the period of dealer participation in surplus machine tool disposal from the time it started, around the first of the year, to Mar. 1. Chicago leads the districts reported with $1,162,000; Detroit followed with $1,037,000; Cleveland $752,000; Philadelphia $370,000; New York $294,000 and Los Angeles 0.

It may be assumed that the Los Angeles district, which could not show a single sale during the period, will be due for some close attention from War Assets Corp. top side.

Many sources find it difficult to evaluate the function of War Assets Corp., with any degree of accuracy, since it is known that many people are buying surplus machine tools but not through dealers. At the same time, it was reported that customers from this area are going to Detroit to do their buying, for anyone of a number of reasons, as the figures above for Detroit would indicate.

o o o

Anticipate Rebuilding Of Surplus Machine Tools

Washington

• • • **Extensive rebuilding** of surplus machine tools that are not in short supply is anticipated in a rebuilding program recommended recently by the Metalworking Machinery Industry Advisory Committee. The Committee, meeting with the War Assets Corp. for the second time, also formally approved a previous recommendation for the establishment of 31 regional advisory committees, to expedite sales of surplus machine tools by WAC.

The Committee recommended that all surplus machine tools less than 25 yr old and in long supply or not disposable on an "as is" basis be offered for rebuilding by the original manufacturer or any other qualified rebuilder. Pointing out that some purchasers of machine tools would not buy surplus equipment unless it is new or rebuilt and carrying a guarantee, the Committee's recommendations provided also that sales for rebuilding should be carried out by a special WAC staff in Washington.

Under the recommended program, WAC would set rebuilding sale prices. The number of machines to be assigned for rebuilding would be agreed upon between WAC and each prospective rebuilder. A machine sold to a rebuilder could not be returned to WAC.

•

OPA Considers Revision Of Machine Tool Prices

Washington

• • • **Under consideration at** OPA is a revision of all pricing orders covering machine tools, production equipment and practically all other producers goods, which would raise the existing price level from 5 to 15 pct. In addition, OPA plans to revoke price controls on some industrial equipment. An order which would lift ceilings on all diesel engines has already started its way through the legalistic maze at OPA.

OPA already is overburdened with applications for price relief from all segments of industry, and the future administrative task will be the greatest ever faced by the price agency.

Rather than process large numbers of individual applications for price increases, OPA believes that it will be wiser to grant an overall average increase of from 5 to 15 pct, depending on the type of machinery or equipment involved.

•

Foreign Orders Retarded

Cincinnati

• • • **While foreign ordering** continues to be in very substantial quantity, uncertainties in the domestic picture are retarding a more active ordering from this source. With a reported allocation of money to China, manufacturers expect a substantial revival of business from this country while orders from Sweden, Denmark and some European countries are reported to be fairly brisk. The strike situation is of course confusing the domestic market greatly. Manufacturers indicate that there is a large amount of inquiry from American tool users but placing of orders continues to be retarded by the shortage in steel and other industries affected by strikes. Several local machine tool plants are still affected by sympathy strikes but on the whole most plants are in position to continue operations at good pace.

•

Output Slowed by Strikes

Cincinnati

• • • **The strike situation** in other industries is beginning to pinch local machine tool manufacturers who have not been directly affected by the strike heretofore.

Inventories are dwindling and chances of obtaining a number of component parts, particularly electrical equipment, is virtually impossible. Several manufacturers are envisioning a cessation of production shortly.

Manufacturers have indicated that on domestic production, they have been shipping machines with rebuilt electric equipment, with the understanding that as soon as the new is available a substitution would be made. On foreign business, however, such an arrangement is said to be impossible, and with order books bulging with foreign business, work on these machines is at a standstill.

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

Super-Rugged

...but smooth and reliable as a fine watch-movement!

DEEPER and deeper go the oil well drillers in their constant search for petroleum reserves... and equipment is being progressively improved to meet the deep well demands. The rotary tables of powerful drilling rigs call for rugged bearings to handle tremendous loads . . . and **KAYDON** bearings are proving capable. They permit full and free rotation of the table, and assure smooth operation, long life, dependable performance.

The success of **KAYDON** bearings in husky oil field equipment is typical of improved results **KAYDON** is helping engineers achieve in heavy-duty machinery for steel mills, paper mills, excavating machinery, cranes, hoists, crushers and other equipment that demands rugged bearings for smooth, efficient operation.

* * *

Counsel in confidence with **KAYDON**. Capacity now available for all sizes and types of **KAYDON** bearings . . . and for atmospheric controlled heat treating, flame hardening, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services.

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

NONFERROUS METALS

. . . News and Market Activities

CPA Plans to Draw On Tin Reserves for 1946

Washington

• • • **Attributing the low** Far Eastern production to lack of equipment and transportation, deterioration of mines and shortage of food for workers, CPA in a recent report said that only about 42,000 tons of tin will be imported in 1946, virtually the same as in 1945.

Despite this poor outlook, however, the government agency said that it plans to supply tin for food packing, for solder and babbitt bearings in automobiles and for other consumer products. To this end CPA proposes to make 65,000 tons of virgin tin available in 1946 by importing 42,000 tons and drawing on government stocks for 23,000 tons. This will be an increase of approximately 7000 tons over last year. The report estimated 1946 secondary tin recovery at about 26,000 tons, bringing total tin available to industry to approximately 91,000 tons.

Imports will include 12,000 tons of pig tin and 30,000 tons of concentrates from Bolivia and the Belgian Congo plus available stocks and production in Malaya, Netherlands East Indies and Siam. Malayan production of tin concentrates this year, the report said, is not expected to exceed 12,000 tons, of which only about one-half will be available for importation into the United States. Since the concentrates must be reduced to pig tin, it was pointed out, it is expected that it probably would be some time in 1947 before the tonnage can be delivered to users.

Withdrawal of tonnage from government stocks, as now planned, will reduce them to about 15,000 tons, after allowing for minimum working requirements at the government-owned Texas Smelter.

An expected further drop in tin requirements for brass and bronze is one of the few bright spots in the 1946 supply and demand picture, CPA officials declared. Tin for brass and bronze, used principally by the armed services, dropped from 33,625 tons in 1944 to 26,826 tons in 1945. A further drop in tin uses for these products is expected in 1946.

•

Offer U.S. Copper Scrap

Washington

• • • **The War Assets** Corp. has authorized government agencies to make direct sales of scrap containing copper and copper base alloys at ceiling prices without declaring it surplus for strategic stockpile. The action was taken on recommendation of the Civilian Production Administration because a deficiency in these strategic metals now exists for civilian industrial requirements. The lack of these metals is described as being so acute that all available scrap containing copper will be required to relieve the shortage.

Sales of such quantities as to allow all purchasers, large as well as small, to compete on equal terms, will be conducted, it was announced. Wide publicity will be given the sales in order to give all interested purchasers an opportunity to buy.

•

Producer Signs

Cincinnati

• • • **The Vulcan Copper** & Supply Co. signed a contract this week providing 18½¢ an hr increase with the United Steel Workers, CIO.

•

See No Rise in Scrap

Washington

• • • **OPA has no plans** for an early increase in ceiling prices for nonferrous scrap, such as copper or brass scrap, Warren N. Huff, Price Executive of the OPA Metals Price Branch announced recently.

"Attention of the price agency has been called to reported sales of copper and brass scrap at prices so high as to exclude the possibility of resale to consumers at prices not in excess of present ceiling prices," Mr. Huff said.

"In view of reports in the trade that dealers in such transactions may be paying high prices in anticipation of an increase in present ceiling prices, I would like to make clear that no increase in ceilings is under consideration at this time."

Dealer purchases of nonferrous scrap are exempt from price control. A dealer may pay any price he may desire for nonferrous scrap. However, he may not sell to consumers at prices higher than the established price ceilings.

•

World Tin Group May End

New York

• • • **It is reported here** that the International Tin Committee met in London recently to consider recommendations from member governments as to termination of its activities. There has been no disclosures as to its action since a report is to be made to its members.

Speculative comment here points out that the primary purpose of the Committee, to allocate production quotas among world producers in order to prevent a glut on the market, is not necessary considering the shortage of world tin supply. Moreover, the policy of the U. S. government is definitely opposed to the existence of international cartels and continued pressure has been exerted on foreign governments to abandon them.

•

Nonferrous Scrap Firm

Baltimore

• • • **The aluminum scrap** market is firm here with all grades in heavy demand and the market being established by the floor prices of the WAC. At the end of the war it was reported that aluminum scrap surpluses were expected to reach 3 billion lb but more recent disclosures have brought this figure down to not much more than a billion. This has of course reflected itself in market operations.

Copper scrap, grades No. 1 and 2, remain firmly at ceiling prices except for manganese bronze, aluminum bronze and brass.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb. contained Be	$30.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$103 to $105
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No.2)	10.00 to 10.50
Aluminum, deoxidizing No. 2, 3, 4	8.25 to 10.50
Brass ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c.

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00[1]
Manganese bronze solids	6.00[2]
Manganese bronze borings	6.25[1]

OPA Group 4†

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	9.50 to 10.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.50
turnings, dry basis	4.50 to 5.00
Low copper alloys 51, 52, 61, 63S solids	8.00 to 9.50
turnings, dry basis	7.00 to 8.50

Plant scrap, mixed

Solids	5.25
Turnings, dry basis	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.50
Old castings and forgings	6.00
Pistons, free of struts	5.00
Pistons, with struts	4.50
Old alloy sheet	5.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb.; 90 to 98% Ni, 22¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25⅛
Electrodeposited	18⅞
Rolled, oval, straight	19⅛
Curved	20⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

. . . News and Market Activities

Market Tightness Prevails; Supplies Low

New York

• • • Scrap movement throughout the country continues to be very slow, as a result of the lag in production of industrial scrap. The small scrap consumers are the hardest hit by the unavailability of supplies, since they were not able, as were the large mills, to build up large inventories during the steel strike.

The stockpiled supplies are now carrying the major mills along, while the small consumers must scramble for the meager offerings. The tight condition of the market

For other scrap news, see p. 120.

is best brought out by the announcement of a scrap collection drive to be soon initiated in order to improve existing supplies.

Prices continue firm, with no changes reported during the past week. Springboards are still being paid, especially in the Pittsburgh district, where $2.00 to $2.50 is the present range of payments made.

•

CORRECTION — THE IRON AGE *last week incorrectly stated that the $3.50 preparation charge had been removed.*

•

PITTSBURGH — The movement of scrap in this district has not changed appreciably, being comparatively slow. Mill stocks accumulated during the strike are still the main source. Springboards of around $2.00 to $2.50 are being paid, but this doesn't permit too wide a range for scrap collections. Production scrap, of course, is practically non-existent, with the bulk coming from railroads, government surpluses, and general collections. On the whole, the mills in the district are not too badly off for scrap, but another couple of weeks may change this picture entirely.

•

CHICAGO—Limited production of industrial scrap continues to hold shipments to consumers to a trickle. Mill operations are unaffected, however, with inventories bolstered by material stockpiled during the strike. Orders are available for all prime openhearth, electric furnace, and foundry grades, but brokers are reluctant to take on large tonnage commitments.

•

PHILADELPHIA—Scrap is still strong here with Pittsburgh mills willing to take eastern supplies even if unprepared. There seems to be an improvement in available supplies here particularly of unprepared scrap. Mills do not seem to be at all concerned with the scrap future. Some factors in the industry consider that the eastern seaboard is benefiting by surplus disposal activities. General Steel Castings Co. is reported to have signed a wage agreement and to be taking scrap shipments.

•

DETROIT—The situation continues practically unchanged here. Both local and outside mills appear to be discontinuing purchases of premium scrap—electric furnace grades and the like—for their openhearths, indicating that the recent strike period has resulted in the building of more comfortable inventory positions. Despite this withdrawal, low phos scrap continues in demand and solidly anchored at ceiling prices, like other grades.

•

BOSTON—Business is only fair. Not all mills are taking scrap, while those that are do not get much. Scarcity of cars to load is a market factor. Scrapmen and railroads say the strike shut off shipments of finished steel, thus bottlenecking cars suitable for scrap loading. Foundries generally are at bottom of cast piles. Many yards report workers grumbling for more pay.

•

NEW YORK—The market here continues unchanged, with prices holding firm at ceiling. Scrap-producing industries are making very little progress in closing the gap between the meager supplies on hand in dealers' yards and the heavy demand. With practically all buying factors back in the market, the tight situation seems to be in for no immediate change.

•

BALTIMORE—In canvassing possibilities for improving the supply of scrap in the present tight market, sources here conclude that the encouragement of collectors would do more to bring in additional scrap than any other move by government or industry. By improving returns to collectors with increased scrap ceiling prices or by authorizing payment of the additional 50¢ brokerage fee on sales of scrap by dealers direct to mills, it is believed possible to encourage collectors to bring in more scrap and to interest additional collectors to enter the business.

•

BUFFALO—Scrap movement through local yards is only about 50 pct of normal for the late winter season, due largely to the strike bottleneck in fabricating plants. More of these, however, are resuming each week, and the outlook is for an increasing flow from this source. Turnings, frequently in oversupply during the war years, are especially scarce, and the cream is off termination offerings in the district. Big consumers of steelmaking grades are comfortably fixed, but it's still strictly a seller's market, with dealers refusing to clutter up their books with orders they can't fill on schedule. Some business recently placed is reported to provide for Canal springboards.

•

CINCINNATI—Users of iron and steel scrap in this area show an intense eagerness to take all the material available, but dealers indicate that supply continues to be very low. Cast and short rails are particularly small in quantity, and brokers are attracting steel in bundles from distant districts in an effort to supply the heavy demand, even at high freight charges. Railroad lists are lighter and production scrap has virtually stopped. Prices, however, continue at ceiling.

•

CLEVELAND—Scrap market conditions here are practically unchanged. Mills are still working on inventories accumulated during the steel strike, although they are taking shipments, and with demand exceeding supply by a considerable margin, the small consumers are doing the scrambling. Major factor in keeping the situation out of balance here is the General Motors strike. Good weather has helped the dealers out. Timken is the only major consumer in this area still out on strike.

•

BIRMINGHAM—Demand here is extremely strong for all grades of material but only limited supplies of blast furnace and cast iron grades are available. There is little production of turnings, and small foundries and soil pipe manufacturers have increased cast consumption. Considerable tonnages of openhearth and foundry grades are moving out of this district to Northern mills.

•

TORONTO—No change was reported in the Canadian scrap iron and steel markets during the past week. The supply situation is acute and dealers state that fresh offerings of scrap are steadily tapering off. The bulk of fresh supply is coming from industrial plants with occasional offerings from War Assets Corp., in the way of war scrap. The severe cold and heavy snow over the past couple of weeks has brought deliveries from rural districts and other outside points to a standstill. Dealers do not look for any improvement in the scrap supply until late April or early May. Prices continue at ceiling levels with consumers unhesitatingly paying tops for all available supplies.

•

Middleton, Ohio

• • • The David J. Joseph Co. announces that William J. Wolf of Hamilton, Ohio, will be associated with the Middleton Iron and Steel Div. of that firm, effective April 1. Mr. Wolf will serve as a vice-president.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	12.50 to 13.25
No. 3 bales	8.50 to 9.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	16.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$13.00 to $14.25
No. 2 hvy. melting	12.00 to 13.25
No. 1 bales	12.00 to 13.00
No. 2 bales	11.00 to 12.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	4.50
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Mar. 12, 1946	Mar. 5, 1946	Feb. 5, 1946	Mar. 13, 1945
Hot-rolled sheets	2.425	2.425	2.20	2.20
Cold-rolled sheets	3.275	3.275	3.05	3.05
Galvanized sheets (24 ga.)	4.05	4.05	3.70	3.65
Hot-rolled strip				
6 in. and under	2.45	2.45	2.10	2.10
Over 6 in.	2.35	2.35	2.10	2.10
Cold-rolled strip	3.05	3.05	2.80	2.80
Plates	2.50	2.50	2.25	2.20
Plates, wrought iron	4.112	4.112	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.25	$5.25	$5.00	$5.00
Tinplate, electro (0.50 lb)	4.75	4.75	4.50	4.50
Special coated mfg. ternes	4.55	4.55	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.25	2.15
Cold-finished bars	3.10	3.10	2.75	2.65
Alloy bars	2.808	2.808	2.70	2.70
Structural shapes	2.35	2.35	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars	4.76	4.76	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	2.75	2.60
Wire nails	3.25	3.25	2.90	2.80
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.00	$43.00
Light rails	49.18	49.18	45.00	43.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$36.00	$34.00
Sheet bars	38.00	38.00	36.00	34.00
Slabs, rerolling	39.00	39.00	36.00	34.00
Forging billets	47.00	47.00	42.00	40.00
Alloy blooms, billets, slabs	56.16	56.16	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.15	2.00
Skelp	2.05	2.05	1.90	1.90

Pig Iron: (per gross ton)	Mar. 12, 1946	Mar. 5, 1946	Feb. 5, 1946	Mar. 13, 1945
No. 2 foundry, Phila.	$27.59	$27.59	$27.59	$26.84
No. 2, Valley furnace	25.75	25.75	25.75	25.00
No. 2, Southern, Cin'ti	26.19	26.19	26.19	25.44
No. 2, Birmingham	22.13	22.13	22.13	21.38
No. 2 foundry, Chicago†	25.75	25.75	25.75	25.00
Basic, del'd eastern Pa.	27.09	27.09	27.09	26.34
Basic, Valley furnace	25.25	25.25	25.25	24.50
Malleable, Chicago†	25.75	25.75	25.75	25.00
Malleable, Valley	25.75	25.75	25.75	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Note: Increased steel prices announced Mar. 1 are retroactive to Feb. 15.

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
March 12, 1946	2.69516¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One week ago	2.69516¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One month ago	2.44104¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One year ago	2.38444¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

	HIGH		LOW		HIGH	LOW	HIGH	LOW
1946	2.69516¢ Feb.	19	2.44104¢ Jan.	1	$25.37	$25.37	$19.17	$19.17
1945	2.44104¢ Oct.	2	2.38444¢ Jan.	2	$25.37 Oct. 23	$23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept.	5	2.21189¢ Oct.	5	$23.61	$23.61	19.17	15.76 Oct. 24
1943	2.29176¢		2.29176¢		23.61	23.61	19.17	$19.17
1942	2.28249¢		2.28249¢		23.61	23.61	19.17	19.17
1941	2.43078¢		2.43078¢		$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan.	2	2.24107¢ Apr.	16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan.	3	2.26689¢ May	16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan.	4	2.27207¢ Oct.	18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar.	9	2.32263¢ Jan.	4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec.	28	2.05200¢ Mar.	10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct.	1	2.06492¢ Jan.	8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr.	24	1.95757¢ Jan.	2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct.	3	1.75836¢ May	2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July	5	1.83901¢ Mar.	1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan.	13	1.86586¢ Dec.	29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan.	7	1.97319¢ Dec.	9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May	28	2.26498¢ Oct.	29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

For Strength with less Dead Weight

J&L OTISCOLOY

SHEETS · PLATES

Many manufacturers are using J&L Otiscoloy sheets and plates to reduce dead weight, increase pay load in buses, trucks, and other equipment. Its high strength and formability make it particularly suitable for use in producing formed structural members to support roofs and side panels. Operators find that its resistance to abrasion and corrosion is a big advantage in reducing maintenance costs and down-time. Ask the nearest J&L District Office for further information.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) applies to certain width and length limitations (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$46.80	$46.80				$46.80	(Bethlehem, Massillon, Canton, Coatesville=$46.80)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$39	$39	$39	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14])			$51[14]	$41		
Carbon, forging billets	$47	$47	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14])				$59[14]	$49		
Alloy	$56.16	$56.16				$56.16	(Bethlehem, Massillon, Canton=$56.16)						$61		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢	(Worcester=2.40¢)					2.55¢	2.80¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.665¢	2.595¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.595¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.29¢	4.22¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.16¢	4.12¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.80¢		4.41¢	4.37¢
STRIP															
Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.81¢	2.77¢
Hot-rolled [3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.71¢	2.67¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.41¢	3.37¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.91¢	
Commodity cold-rolled	3.20¢	3.30¢		3.20¢			3.20¢	(Worcester=3.60¢)					3.30¢	3.56¢	
TINPLATE															
Standard cokes, base box	$5.25	$5.25	$5.25		$5.35			$5.35	$5.35					$5.60[11]	$5.53[11]
Electro, box 0.25 lb	$4.60	$4.60	$4.60					$4.70							
Electro, box 0.50 lb	$4.75	$4.75	$4.75					$4.85	$4.85						
Electro, box 0.75 lb	$4.90		$4.90					$5.00	$5.00						
BLACKPLATE															
29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢			4.30¢			3.57¢
TERNES, MFG.															
Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.82¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.59¢	2.67¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		2.57¢
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.42¢
Alloy, hot-rolled	2.808¢	2.808¢				2.808¢	2.808¢	(Bethlehem Massillon, Canton=2.808¢)					2.908¢		
Alloy, cold-drawn	3.484¢	3.484¢	3.484¢	3.484¢		3.484¢							3.584¢		
PLATE								(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.69¢	2.55¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.11¢	4.07¢
Alloy	3.64¢	3.64¢			(Coatesville=3.64¢)						4.108¢	4.316¢		3.64¢	3.73¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.52¢	2.465¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.55¢			4.55¢			(Worcester=4.75¢)								
0.76 to 1.00 carbon	6.40¢			6.40¢			(Worcester=6.60¢)								
1.01 to 1.25 carbon	8.60¢			8.60¢			(Worcester=8.80¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.55¢			3.37¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	3.65¢	3.65¢		3.65¢			(Worcester=3.75¢)					4.15¢			3.97¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢			2.97¢

CORROSION AND HEAT RESISTANT STEELS

in cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36.00	34.00	26.50	29.00	32.50	36.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30.00	28.00	22.00	22.50	32.00	52.00
Rod, h-r, Newark, N. J., Syracuse	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless P'gh, Chi, Canton, (4 in. to 6 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher: East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	48.29
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

(*Also Canton, O.)	base per lb
High speed	72.5¢
Straight molybdenum	58.4¢
Tungsten-molybdenum	62.2¢
High-carbon-chromium*	46.5¢
Oil hardening*	26.0¢
Special carbon*	23.8¢
Extra carbon*	19.5¢
Regular carbon*	15.2¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00*	19.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.00	....
Inconel-clad		
10 pct, f.o.b. Coatesville	25.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.25	$3.75
Coated nails	3.25	3.75
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	.72	.90
Fence posts, carloads	.74	.91
Single loop bale ties††	72	97
Galvanized barbed wire**	.79	.89
Twisted barbless wire	.79	.89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
NE 8600	0.676¢	$13.52	1.196¢	$23.92
NE 8700	0.728	14.56	1.248	24.96
NE 9400	0.780	15.60	1.300	26.00
NE 9700	0.676	13.52	1.196	23.92
NE 9800	1.352	27.04	1.872	37.44
NE 9900	1.248	24.96	1.612	32.24

The extras shown are in addition to the base price of $2.808 per 100 lb on finished products and $56.16 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.26¢ per lb for bars and bar-strip and $5.20 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
½-in.	60½	48
¾-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

½-in.	18	+4
¾-in.	24	2½
1-in. and 1¼-in.	28½	9
1½-in.	33	12
2-in.	32	11

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	25	4½
2½-in. to 3½-in.	26	7
4-in.	28	11
4½-in. to 8-in.	27	10

Steel (butt, extra strong, plain ends)

½-in.	58½	47½
¾-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

½-in.	19	+1½
¾-in.	25	4½
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28	8½
2½-in. to 4-in.	34	16
4½-in. to 6-in.	32	14½

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lap-weld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.69	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft or 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....$60.80
6-in. and larger, del'd New York... 60.20
6-in. and larger, Birmingham..... 52.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle 74.00

For all rail shipment; rail and water shipment less.

Class "A" and gas pipe, $3 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter....65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes.....62
Plow bolts.....65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller.....62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger.....56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer

Packages, nuts loose.....71 and 10
In packages.....71
In bulk.....80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....$3.75

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....65 and 5

Cap and Set Screws	*Consumer Percent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh.....21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh.....20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe.....12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.....4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots.....63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.....42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90¢
Aluminum, 100 and 200 mesh.....*25¢
Antimony, 100 mesh.....30¢
Cadmium, 100 mesh.....$1.40
Chromium, 100 mesh and finer....$1.25
Lead, 100, 200 & 300 mesh....11½ to 15¢
Manganese.....65¢
Nickel, 150 mesh.....51½¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh.....58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb.....$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb..$2.60
Under 100 lb.....$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-Duty brick, St. Louis	$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey	51.95
No. 1 Ohio	45.60
Ground fire clay, net ton	8.05
Silica Brick	
Pennsylvania and Birmingham	$54.40
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

Old range, bessemer, 51.50..... $4.95
Old range, non-bessemer, 51.50.... 4.80
Mesaba, bessemer, 51.50..... 4.70
Mesaba, non-bessemer, 51.50..... 4.55
High phosphorus, 51.50..... 4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES*

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.868a	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$6.866	$7.072	$8.172
New York	3.59	4.613	5.210	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.324[9]	4.108	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.994	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.471	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.331	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.60	6.65	6.85	7.75
Milwaukee	3.387	4.337	5.372	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	8.137
Cleveland	3.35	4.40	4.977	3.60	4.45[17]	3.40	3.588	3.35	3.85	5.808	6.856	6.85	7.75
Buffalo	3.35	4.40	4.85	3.819	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.85	7.75
Detroit	3.45	4.50	5.10	3.70	4.659[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.925[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347	5.231	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.85	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.85	7.75
St. Paul	3.50	4.46	5.357	3.86	5.102[17]	3.811[3]	3.811[3]	3.761[3]	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.615	4.143	....	4.093	4.093	4.043	4.543	....	....	....	....
Indianapolis	3.52	4.568	5.018	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.85	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965	4.78	5.365	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.458	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.413[1]	4.313	....	4.25	4.25	3.75	8.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20	6.20	4.95	5.613[18]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.45	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	6.05	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.85	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.271[3]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

* Until new detailed warehouse prices are reported by distributors, no change will be made in the prices below. However, OPA says recent steel price adjustments may be added to the prices quoted here.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-FINISHED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

GALVANIZED: 450 to 1499 lb.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 800 to 4999 lb. (12) 800 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$28.25	$28.75	$27.25	$27.75	.....	Boston	Everett	$ .50	$26.75	$27.25	$27.75	$28.25	.....
Birdsboro	26.25	26.75	27.25	27.75	$31.25	Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$35.27
Birmingham	20.75	22.13	.....	26.75	.....	Brooklyn	Bethlehem	2.50	28.75	29.25	29.75	30.25	.....
Buffalo	24.75	25.75	26.25	26.75	31.25	Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	34.17
Chicago	25.25	25.75	25.75	26.25	.....	Canton	Clev, Ygstn, Sharpsvil.	1.39	26.64	27.14	27.14	27.64	.....
Cleveland	25.25	25.75	25.75	26.25	.....	Canton	Buffalo	3.19	.....	.....	.....	.....	34.44
Detroit	25.25	25.75	25.75	26.25	.....	Cincinnati	Birmingham	4.06	24.81	26.19	.....	.....	.....
Duluth	25.75	26.25	26.25	26.75	.....	Cincinnati	Hamilton	1.11	.....	.....	26.86	.....	.....
Erie	25.25	25.75	26.25	26.75	.....	Cincinnati	Buffalo	4.40	.....	.....	.....	.....	35.65
Everett	26.25	26.75	27.25	27.75	.....	Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	.....
Granite City	25.25	25.75	25.75	26.25	.....	Jersey City	Birdsboro	1.94	.....	.....	.....	.....	33.19
Hamilton	25.25	25.75	25.75	.....	.....	Los Angeles	Provo	4.95	28.20	28.70	.....	.....	.....
Neville Island	25.25	25.75	25.75	26.25	.....	Los Angeles	Buffalo	15.41	.....	.....	.....	.....	46.66
Provo	23.25	23.75	.....	.....	.....	Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	.....
Sharpsville [1]	25.25	25.75	25.75	26.25	.....	Mansfield	Buffalo	3.36	.....	.....	.....	.....	34.61
Sparrows Point	26.25	26.75	.....	.....	.....	Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	.....
Steelton	26.25	.....	.....	.....	31.25	Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	32.49
Swedeland	26.25	26.75	27.25	27.75	.....	San Francisco	Provo	4.95	28.20	28.70	.....	.....	.....
Toledo	25.25	25.75	25.75	26.25	.....	San Francisco	Buffalo	15.41	.....	.....	.....	.....	46.66
Youngstown	25.25	25.75	25.75	26.25	.....	Seattle	Provo	4.95	28.20	28.70	.....	.....	.....
						Seattle	Buffalo	15.41	.....	.....	.....	.....	46.66
						St. Louis	Granite City	.50	25.75	26.25	26.25	26.75	.....
						St. Louis	Buffalo	7.07	.....	.....	.....	.....	38.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$31.25; f.o.b. Buffalo—$32.50. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed.

96-98% Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Low-Carbon Ferromanganese

Contract price per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% C, 0.06% P, 90% Mn	23.00¢	23.40¢	23.65¢
0.10% max. C, 1% or 2% max. Si	23.00¢	23.40¢	23.65¢
0.15% max. C, 1% or 2% max. Si	22.00¢	22.40¢	22.65¢
0.30% max. C, 1% or 2% max. Si	21.00¢	21.40¢	21.65¢
0.50% max. C, 1% or 2% max. Si	20.00¢	20.40¢	20.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Silicomanganese

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
Ton lots	6.70¢
Briquet, contract basis, carlots, bulk, freight allowed, per lb. of briquet	5.80¢
Ton lots	6.30¢
Less ton lots	6.55¢

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

Contract price per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

Contract price per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination. 40% Si.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
Ton lots	3.80¢	4.20¢	4.25¢

Electric Ferrosilicon

Contract price per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Ferrochrome (65-72% *Cr, 2% max. Si*)

Contract prices per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	20.50¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

Briquets—contract price per pound of briquet, f.o.b. shipping point, freight allowed. 60% chromium.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	14.00	14.40	15.00
Ton lots	14.90	15.55	16.75
Less ton lots	15.40	16.05	17.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25 max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices per pound, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.85¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.			
Ton lots	12.00¢	12.75¢	14.75¢
Less ton lots	12.50¢	13.25¢	15.25¢
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.			
Ton lots	11.75¢	12.50¢	14.50¢
Less ton lots	12.25¢	13.00¢	15.00¢

SMZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00¢	12.85¢	14.60¢
Less ton lots	12.50¢	13.35¢	15.10¢

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45¢, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30

NATIONAL-STANDARD COMPANY
NILES, MICHIGAN

Wire Braids flat and tubular in Steel or other metal. Tapes and Specialized Wire Products for Tire Beads, Steam Hose Armor, Reinforcement for Oil Well Drilling Hose. Braided Covering for Flexible Tubing, Aircraft and Tank Radio Shielding. Stranded Wire for reinforcing Flat and V Belts. Braided Covering for Electrical Cables. Drawn wire in small sizes down to .002, of Steel, Aluminum, Brass, Monel, Nickel Silver, Stainless Steel, Phosphor Bronze and other Alloys.

WORCESTER WIRE WORKS, DIVISION
WORCESTER, MASS.

High quality Wire in small diameter sizes, down to .006. Round, Low and High Carbon Steel. Annealed, Hard Drawn, Tempered, Bright, Liquor Finish, Tinned, Copper Coated, Cadmium Coated, Galvanized.

THE ATHENIA STEEL COMPANY, DIVISION
CLIFTON, NEW JERSEY

Cold Rolled, High Carbon Flat Steels in widths of 1/16" to 6½", Thickness .0015 to .062 Custom-made Steels—.60 Carbon and higher. Entire range of Annealed, Hard Rolled, Black Tempered, Tempered and Polished or Tempered and Polished with Blue or Straw Colored finish, Best quality Small Flat Springs.

WAGNER LITHO MACHINERY CO., DIVISION
HOBOKEN, NEW JERSEY

Complete lines of automatic equipment—designed, manufactured and installed for can companies and others using sheets in the metal decorating trade. Individual units consist of Roller Coating Machines, Conveyor Type Ovens and Auxiliary Equipment for tandem operation with lithographing presses, etc.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

What Does This Trade-mark Mean?

SELDOM does this trade-mark label a stock item. Rather, it identifies a product specifically developed for a special application. It may be a type of steel for piston rings, stainless steel wire for sound recorders, or highly specialized braided wire for automobile tire beads.

Whatever product it is . . . from any one of the four divisions of National-Standard... you can be sure the N-S trade-mark means that the product is the result of: a careful study of the customer's methods of manufacture, an analysis of the performance required, rigid quality control to assure uniformity in every pound of the material developed.

This, plus the willingness of National-Standard engineers to tackle the toughest applications for their specialized products, makes theirs a unique service. Why not put these services to work for *your* benefit?

THE PROBLEM . . . .

Removal of up to 40% iron and steel turnings from tightly curled bronze turnings.

THE SOLUTION . . . .

Dings Type DA Magnetic Separators

Bronze, iron, and steel turnings, tightly enmeshed in bulk scrap, presented a real recovery problem in a large eastern plant until two Dings Type DA Magnetic Separators were put to work handling the heavy daily volume of recoverable material.

Plant requirements demanded no more than 0.1% iron present in recovered non-magnetic turnings. The mixture entered the Dings Type DA Separators uncrushed and contained up to 40% iron and steel turnings mixed with the bronze. As shown in the accompanying diagram, Dings Type DA Separators provide double magnetic separation by means of two powerful magnetic pulleys: one above, and the other below the belt carrying the material to be separated. An agitating feeder helps to disentangle the turnings, which are then efficiently and automatically separated by the magnetic pulleys.

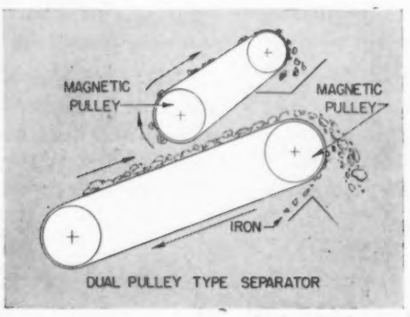
If you have a difficult separation problem, bring it to Dings. There is no obligation to you for Dings Engineering service and complete recommendations.

DINGS MAGNETIC SEPARATOR CO.

516 E. Smith Street
Milwaukee 7, Wisconsin

Dings MAGNETIC SEPARATION HIGH INTENSITY

"Separation Headquarters Since 1899"



DUAL PULLEY TYPE SEPARATOR

Aircraft Scrap Sales Put on Periodic Basis

Washington

• • • **Outlining procedure** for the purchase of surplus aeronautical scrap and equipment, the War Assets Corp., has announced that the material will be periodically available from two sources. These are (1) airposts in the southern part of the United States which have designated as WAC's sales-storage depots where large numbers of surplus airplanes are now concentrated; and (2) Army or Navy warehouses in different parts of the country.

When material becomes available at airports within an area served by one of the WAC regional offices, each person who is on the mailing lists to get notices of sales or invitations to bid will be notified of availability and information regarding the method of purchase.

Interested persons should contact regional offices and request that their names be added to the mailing list. These offices are located in New York, Atlanta, Chicago, Dallas, Kansas City, Los Angeles, and Portland, Ore.

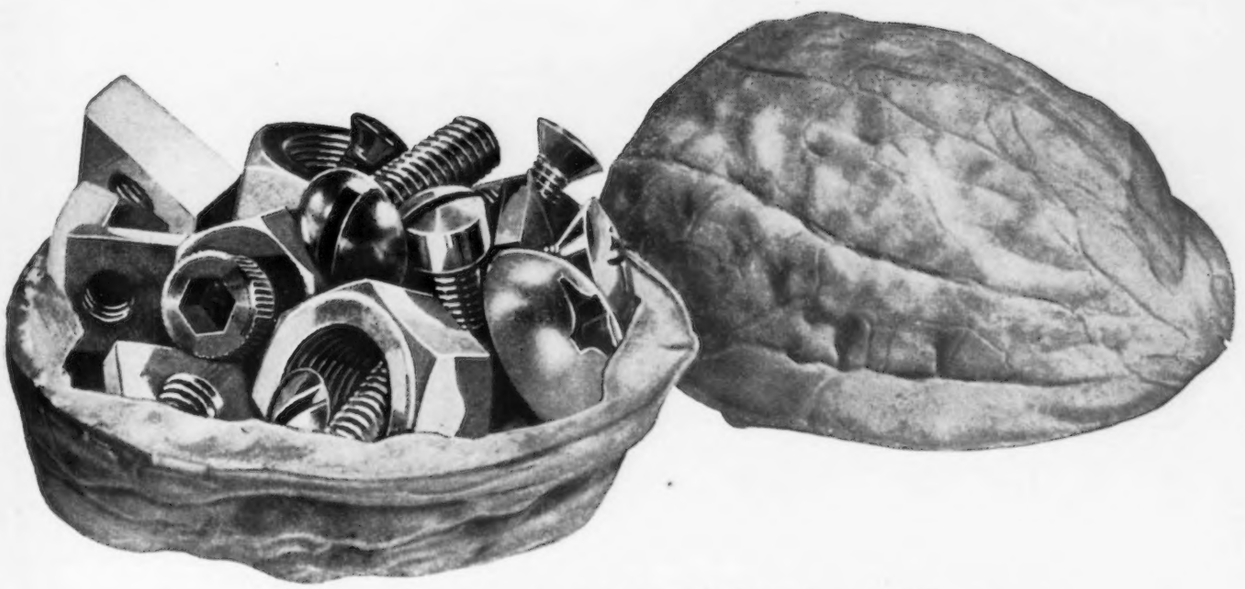
As to the materials which are to be disposed of as scrap from various Army or Navy warehouses, inquiries should be made directly to the following: Headquarters AAF ATSC, attention: Redistribution & Salvage Section, Wright Field, Dayton, Ohio; or Navy Materiel Redistribution and Salvage Disposal, 342 Madison Ave., New York 17.

CF&I Official Killed

Denver

• • • **Lewis F. Quigg,** 57, executive vice-president of the Colorado Fuel & Iron Corp., was fatally injured in an automobile accident on Feb. 26 while enroute to Pueblo, Colo. He began his steel career with the Cambria Steel Co. in 1905. In 1928 he joined the Colorado Fuel & Iron plant at Pueblo as general superintendent, advanced to vice-president in charge of operations, and later was named executive vice-president, director and member of the executive committee. When CF&I and Wickwire-Spencer Steel Co. merged last October, Mr. Quigg was re-elected executive vice-president.

We have it in a nutshell...



Maybe you think stainless is a shell game—you win very seldom. Wrong! Stainless is not difficult, only different, and we can easily explain the differences, show how to machine, cold upset, forge, weld, heat treat, electropolish, work it successfully, economically. You see, we're nuts about stainless. We've never done anything but produce it, study it, help others fabricate it into products of economical long life, enduring lustrous beauty, such as bolts, nuts, screws, nails, cutlery. Many firms have found our assistance invaluable. To obtain it without obligation, just write Rustless Iron and Steel Division, The American Rolling Mill Company, Baltimore 13, Maryland. Sales offices in principal cities, distributors everywhere.

Stainless Steel Specialists

Rustless

DIVISION OF ARMCO

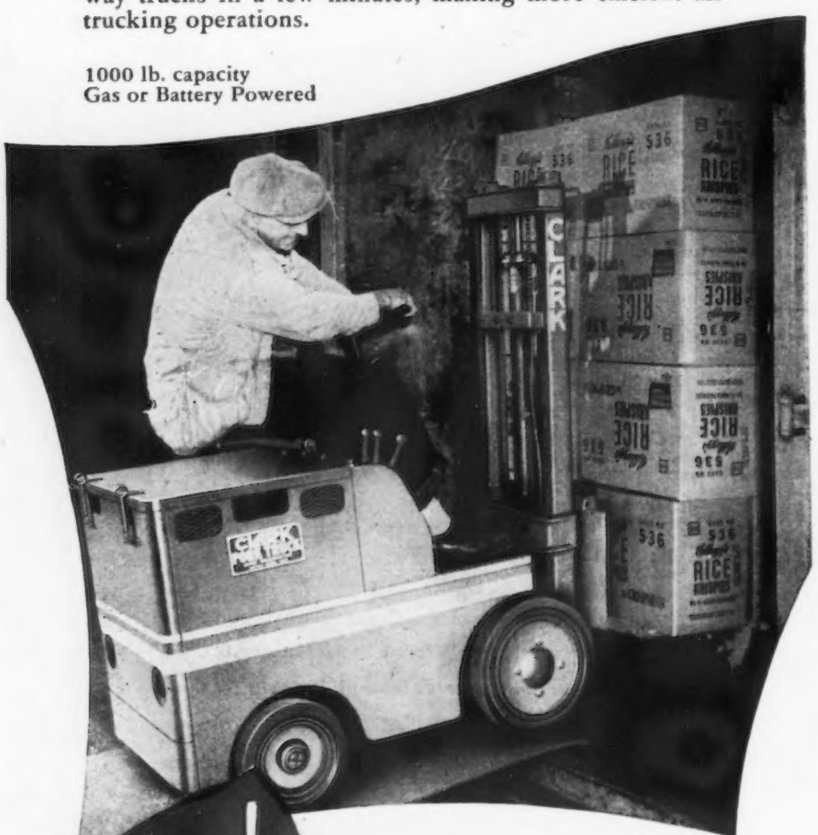
Here it is!

A NEW METHOD... A NEW VEHICLE

A unique fork truck to load and unload highway trucks in less time at lower cost.

Clark Tructractor has from its birth in 1917 pioneered new methods of material handling. As its postwar product it introduces the Clark Trucloader, substituting for manual labor, a light compact fork truck to load and unload highway trucks in a few minutes, making more efficient all trucking operations.

1000 lb. capacity
Gas or Battery Powered



Now!

CLARK TRUCLOADER

Another PRODUCT of CLARK EQUIPMENT COMPANY

SEND FOR NEW BOOKLET ON CLARK TRUCLOADER METHOD

CLARK TRUCTRACTOR DIVISION
BATTLE CREEK, MICHIGAN

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS • AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS • INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS • METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

J&L Workers Fight Fire To Limit Mill Damage

Pittsburgh

• • • **Jones & Laughlin** Steel Corp. officials credited the fast and courageous efforts of workers at the South Side Works polishing mill in limiting a fire to damages estimated at $65,000. This is about half of the original estimates of damage. The six-alarm fire was discovered by a watchman about 4:00 a.m., last Friday after it had spread over quite a wide area from an apparent start in a locker room.

The flames spread through the entire polishing mill, but were brought under control before there was much damage to draw benches and some other expensive equipment and dies. The building was pretty well demolished, but because the plant's fire fighting equipment got into action at the start, company officials state that damages were far less than expected.

Reports 1945 Banner Year

Portland, Ore.

• • • **Iron Fireman Mfg. Co.** has reported net profit of $776,876.51 in 1945 after providing $2,003,370 for taxes, it was announced by T. H. Banfield, president, following the recent annual directors' meeting.

Roy L. Shurtleff, San Francisco, vice-president and director of Blyth & Co., was elected to fill the vacancy on the board caused by the death of M. P. Griffith, Blyth & Co., last November, as director and voting trustee.

A dividend of $1.20 per share was voted on 359,910 shares outstanding as of Feb. 1, 1946. This dividend is payable quarterly on March 14, June 1, Sept. 3 and Dec. 2.

Earnings for 1945 were exceeded only by 1943 in the company's 23-yr record. The sales volume of $17,262,182.28 was the largest except for two of the war years—1943 and 1944. The profit percentage in 1945 was 4.5 pct of sales.

During the year the company, with option to purchase, leased the L. R. Teeple Co., manufacturers of controls and who for years have manufactured the controls which Iron Fireman have used. These facilities will be expanded to other fields.

The CONE AUTOMATIC MACHINE COMPANY sees many GOOD THINGS AHEAD

It is reported that . . . . . .

The National Advisory Committee for Aeronautics proposes to release to schools, libraries and industries over 300 technical reports hitherto secret.

get ready with CONE for tomorrow

Lycoming is experimenting with two new aircraft engines: a 36-cylinder, 5,500 lb. radial developing 5,000 h.p., and a 12-cylinder, 2,100 h.p., weighing only 1,445 lbs.

get ready with CONE for tomorrow

Monsanto Chemical Co. has a plastic armor plate that has shattered machine gun bullets in tests.

get ready with CONE for tomorrow

Curtiss-Wright is working on an "uninhabited" airplane capable of 1,400 miles per hour.

get ready with CONE for tomorrow

Firestone is making a heavy-duty tire with a wire carcass for off-the-road trucking.

get ready with CONE for tomorrow

A new distillery, the largest of its kind in the Western Hemisphere, will be built in Maine to make alcohol from Aroostook County potatoes.

get ready with CONE for tomorrow

Shell Oil Company has a new combustion head for gun-type domestic burners that will cut fuel consumption 20% and is suitable for use on burners now in operation.

get ready with CONE for tomorrow

Eastman Kodak promises that any reasonably well equipped amateur will soon be able to make his own color transparencies and prints.

get ready with CONE for tomorrow

Jack and Heintz will manufacture the Skinner gasoline engine. This is a double-opposed "pancake" type, made largely of aluminum with a compression ratio of 8 to 1 and a weight of less than 2 lbs. per h.p.

Mellon Institute has found, after thorough testing, that solid magnesium alloys do not burn.

get ready with CONE for tomorrow

The Weather Bureau has begun a survey of the country's wind resources in anticipation of the use of wind power for generating electricity.

get ready with CONE for tomorrow

A new kind of glass made by American Optical Company transmits 90% of visible light rays, but only 10% of heat rays.

get ready with CONE for tomorrow

Fifteen years of research have led to a form of porcelain enamel, made by C. Hommel Co. of Pittsburgh, that is so thin as to be practically chipless.

National Carbon Company has a new oil made with a secret non-petroleum base, called "Prestone Motor Oil" that shows very little change in viscosity from 30° below zero to operating temperature.

get ready with CONE for tomorrow

Illinois Central and Edison General Appliance Co. have collaborated on the first all-electric dining car, scheduled to go into service early in 1946. The car has its own diesel generating plant which supplies all facilities for cooking, freezing, dish washing, garbage disposal and air conditioning.

get ready with CONE for tomorrow

The Celotex Corporation has patented a process for making building planks out of excelsior and Portland cement.

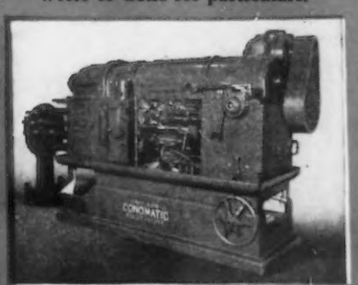
get ready with CONE for tomorrow

Another substitute for natural paint brush bristle is made of casein and was developed by the Eastern Regional Laboratory of the U. S. Department of Agriculture.

3 of these diameters are eccentric

This washing machine part, made of B-1112, is machined from round stock on a 1⅝" 8-Spindle Conomatic in 10 seconds. Three of its five diameters are eccentric to .018".

Write to Cone for particulars.



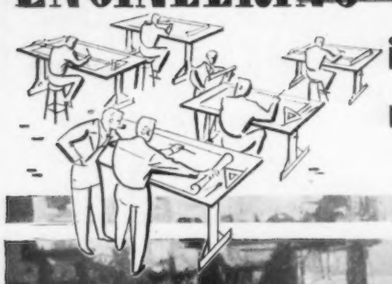
Ask your CONE representative to show you our new color motion picture

CONE

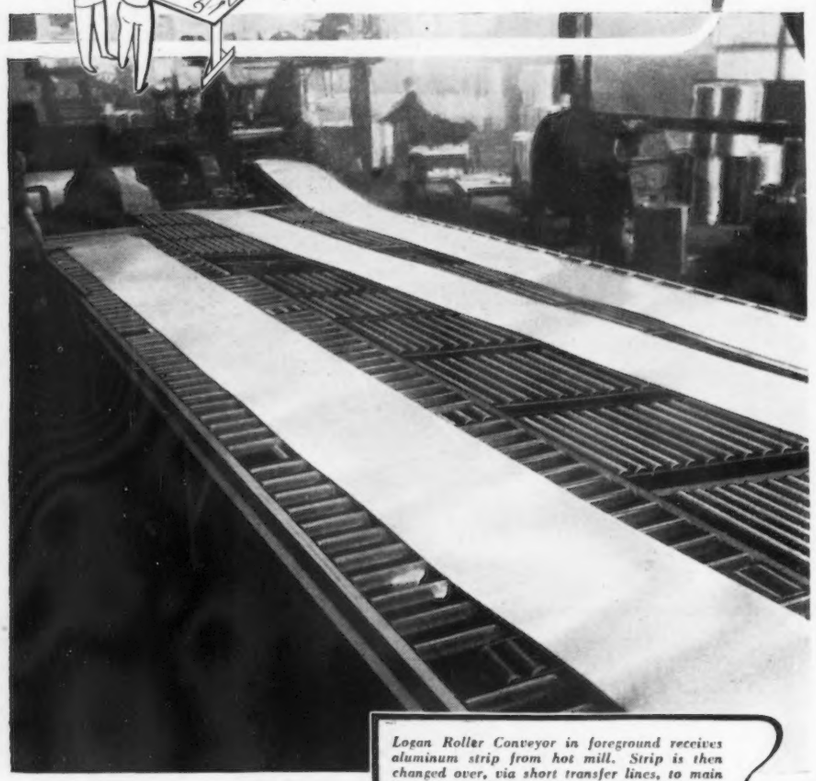
AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

26

ENGINEERING *is our business*



it's what you really buy!



Logan Roller Conveyor in foreground receives aluminum strip from hot mill. Strip is then changed over, via short transfer lines, to main line, in background, feeding to cold mill.

The installation of a conveyor system involves more than a consideration of the quality and dependability of the actual equipment needed. Engineering proficiency not only in the design and construction of the conveyors, but also in their adaptability to the problem involved, is of equal importance. Proof of Logan's ability to profitably engineer conveyor systems to countless handling problems is in evidence in many of the nation's major industrial plants.

LOGAN CO., INC., 545 Cabel, Louisville 6, Ky.

ALL OUR WORLDLY GOODS we owe to the FREE ENTERPRISE SYSTEM

Logan Conveyors

PUT *FLOW* INTO PRODUCTION

Tube Co. to Make Air Cylinders at Christy

Pittsburgh

• • • **Reopening of the** Christy Park Works of National Tube Co., on a limited basis was announced by C. R. Cox, president. An order for gas cylinders and a prospective contract for spheroidal pressure vessels for the distribution of protane and butane gases have made possible the reopening of this plant, which was closed down shortly after VJ Day.

While the operations at the plant will be of a limited nature for a while, this new business permits the company to take the initial step in getting operations underway again at the plant. The work initially will employ about 250 men, but will not start operations for a couple of weeks.

Christy Park Works produced more than 27 million shells and bombs during the war. The bomb-spinning method originated to speed up bomb production will be utilized for high speed peacetime production of cylinders from seamless pipe. The only work that has been maintained at Christy Park since the end of the war has been some research and development work for the armed services.

Stainless, Tool Steel Prices Increased Now

New York

• • • **Crucible Steel Co.** of America announces an increase of 8.2 pct in tool and high speed steel prices in accordance with authority granted under OPA regulations.

The company announces a similar increase in prices for all stainless products on which OPA removed the ceiling as of Oct. 16, 1945.

Announces Expansion Plan

Buffalo

• • • **The Buffalo Tool** & Die Co. has purchased a one-story building with 20,000 sq ft of floor space, which was part of the old Pierce-Arrow Motor Car Co. property in Elmwood Ave., and plans to move to the new quarters about April 1.

Peter J. Hosta, Jr., head of the company, announced plans to double employment when the shift is completed.

ARISTOLOY STEELS

if you want the best

ARISTOLOY
STEELS

● The top quality steels are electric furnace steels. The electric furnace is the most efficient method by which the steel maker can hit close specification marks consistently and accurately. ALL ARISTOLOY STEELS ARE MADE IN ELECTRIC FURNACES.

Our rolling and finishing equipment is second to none. We believe that we have the finest metallurgical and chemical laboratories — including Spectrographic analysis — where every operation, from melting to shipping, is carefully checked. Specialty steels, along with Aristoloy Stainless, Alloy Steels and Coppco Tool Steels receive special care regardless of the size of the order.

Our representative will gladly discuss and make recommendations relative to your requirements. You'll make no mistake specifying ARISTOLOY.

STANDARD STRUCTURAL ALLOY STEELS • MAGNAFLUX-AIRCRAFT QUALITY STEELS • BEARING QUALITY STEELS
CARBON TOOL STEELS • ALLOY TOOL STEELS • STAINLESS STEELS • NITRALLOY STEELS • SPECIALTY STEELS

COPPERWELD STEEL COMPANY • WARREN, OHIO

ARISTOLOY STEEL INTERNATIONAL COMPANY • EXPORT DIVISION • 815 FIFTEENTH STREET, N. W., WASHINGTON, D. C.

More Passes Before Patenting

When Drawing Wire With

OAKITE CrysCoat

REG. U. S. PAT. OFF.

PROCESS

150 to 300 per cent longer die life is but one of the many outstanding advantages provided by the Oakite CrysCoat Process when used as an undercoat before liming in the drawing of high carbon rod. The intrinsic lubricating qualities of the Oakite CrysCoat Process assure increased output; better wire; trouble-free production.

Retarded Rusting Reduces Re-coating

Rods treated with the Oakite CrysCoat Process acquire a fine crystalline phosphate coating which serves as a rust-retardant. This means that less wire is returned to the cleaning house for re-cleaning and re-coating.

Pickling Time Cut

Drawn wire processed with Oakite CrysCoat requires less pickling time because of the reduced build-up of scale and oxidation when wire is passing through patenting or annealing operations.

Technical Data FREE

Special Bulletin giving all necessary technical data is yours free for the asking. Comprehensive in-plant tests gladly arranged for on request. Investigate the Oakite CrysCoat Process TODAY!

OAKITE PRODUCTS, INC.
30H Thames Street, New York 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

MATERIALS • METHODS • SERVICE

Announces Lease Of McCook Aluminum Mill By Reynolds Metals

Washington

• • • **The lease of** the government-owned aluminum sheet mill at McCook (Chicago), Ill., to the Reynolds Metals Co. was announced on Mar. 1 by the War Assets Corp. The acceptance of the Reynolds proposal over offers made by three other companies was influenced primarily, WAC said, by the policies laid down by the Surplus Property Administration in its report of Sept. 21, 1945, to Congress. The lease is subject to the approval by the Attorney General.

It is a five-year lease and provides for annual rentals equivalent to 5 pct of net sales. Minimum rentals are to be $750,000 for the first year, $1 million for the second year, $1.5 million for the third year, $2 million for the fourth year, and $2,482,312 for the fifth year. The fifth-year minimum rental will be 8 pct of $31,028,900, the estimated present-day depreciated reproduction cost of the plant. Reynolds is to have an option to purchase the plant at a price to be calculated according to standard WAC terms. WAC is to put the plant in efficient operating condition for Reynolds at government expense.

Proposal of the Aluminum Co. of America to purchase the plant for $30,135,000, or to lease it for an annual rental of $2,410,800, and put the plant in efficient operating condition at its own expense could not be accepted, despite the attractive terms, WAC said. ALCOA, it was pointed out, was not considered eligible to acquire this plant in the opinion of the Attorney General whose consent is necessary under Section 20 of the Surplus Property Act.

A proposal to lease part of the plant for conversion to magnesium sheet production and a proposal by the General Motors Corp. to lease another portion for the manufacture of diesel motors were also rejected. WAC pointed out that SPA's report on aluminum had specifically recommended that first preference on these facilities be given to firms, other than ALCOA, that would use them for aluminum operations. Moreover, it was believed that the utilization of the McCook plant for rolling aluminum would provide a greater utilization of its facilities than its use for the rolling of magnesium. It is understood that Reynolds will make available approximately 300,000 sq ft to General Motors to permit the latter to continue its current operations in the production of diesel engines.

The government invested $44,326,737 in the McCook plant, of which $24,591,935 was for machinery and equipment, $18,896,304 for buildings, $752,396 for land and improvements, and $86,102 for tools and automotive equipment. The plant has a capacity of 288 million lb per yr.

The McCook plant is the ninth aluminum facility to be disposed of by WAC and its predecessors since Jan. 1, 1946, under the Surplus Property Act. The other properties are: The alumina plant at Hurricane Creek, Ark., the aluminum ingot plants at Spokane, Wash., and Jones Mills, Ark., the rolling mills at Trentwood, Wash., and Listerhill, Ala., the extrusion plants at Los Angeles, Grand Rapids, and a portion of the Burlington, N. J., metal plant to be used for this purpose.

ALUMINUM BATS: *The light metal is offered for competition with a time honored application for wood at Alcoa's "aluminum living" exhibit at Newark, N. J.*

"The Best Lathe Ever Made!"

ST. LOUIS
AUSTRALIA
MELBOURNE
Says User from "Down Under," about his 22" HYDRATROL LATHE
LEHMANN MACHINE COMPANY ST. LOUIS U.S.A.
LEHMANN MACHINE COMPANY ST. LOUIS U.S.A.

Heavy Duty Lathes
20" to 36"

THIS Melbourne concern, which has had a 22" Heavy Duty HYDRATROL LATHE in constant use for the past 2 years, recently wrote us:

"We have had lathes from all nations in use these twenty-five years, but your lathe is certainly something to be proud about.

"We have found that the design is really marvelous, and has been carried out to perfection.

"I, and all my business friends that have seen this Hydratrol Lathe working, agree that it is the best engine lathe ever manufactured, and you have every reason to be proud of your product."

Let us show you what a Heavy Duty HYDRATROL LATHE could do in your shop.

LEHMANN MACHINE COMPANY, ST. LOUIS 3, MISSOURI

HYDRATROL LATHES
(HEAVY DUTY TYPE)

KINNEAR
Rolling Doors

Time-tested KINNEAR Rolling Doors offer positive "open-and-shut" proof of resilient strength, long life, and efficient operation in installations of any type and size. Witness the smooth, quick, spring-counterbalanced, *coiling upward action* of the interlocking-slat steel curtain! It rolls into a small area above the lintel, clear of plant traffic. Permits full use of all adjoining space. Resists weather, wear, and fire. Always ready for instant use. Motor operation and push-button remote control are available for extra advantages of convenience and economy to KINNEAR Rolling Doors. For complete facts in this case, write today!

THE KINNEAR MFG. CO.
Factories: 1760-80 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in Principal Cities

KINNEAR ROLLING DOORS

National Acme Reports Profits; Negotiates DPC Plant Purchase

Cleveland

• • • **National Acme Co.,** with an eye toward its overall program for diversification in the machine tool field, is negotiating for a term lease with the Government for the DPC plant which housed the company's aircraft program during the war.

This was revealed by F. H. Chapin, company president, in his letter to shareholders which showed a net profit of $1,789,881 for 1945, after provision for federal taxes on income, and reserves for renegotiation and contingencies. Net is equal to $3.58 per share on the company's capital stock.

Mr. Chapin said that National Acme's 1945 operations had been greatly handicapped by the epidemic of strikes which temporarily closed the plants of the company's suppliers.

"The virtual impossibility of obtaining sufficient materials, including steel, electrical items, and bearings, as well as the inability of some customers to accept delivery of shipments forced us to all but close our own factory," he said.

The trend of high hourly wages and selling price controls will create a greater demand for labor-saving machinery, he predicted. Concomitantly, National Acme has increased its research facilities which should prove valuable for exploring new fields for the application of our automatic machinery, tools from the threading division and new electrical devices that fall within the scope of the company's engineering ability and equipment, he said.

"With a substantial backlog of orders now on the books, and a sales outlook that is favorably affected by the addition of several new machine tools to our line, it is hoped that we can continue to progress without interruption.

"Surplus war machinery has not proved much of a menace so far, Mr. Chapin pointed out. "Most of our customers prefer to purchase our new and further improved machines rather than take chances on used ones that may have suffered abuse in the hands of unskilled operators."

Urges Continued Control

Washington

• • • **Declaring that** fair and equitable treatment had been accorded him, both as producer and seller, during wartime control, Henry J. Kaiser recently urged extension of OPA and price control to aid in "facing actualities of inadequate supply" until production approaches demand.

Appearing before the House Banking & Currency Committee, Kaiser declared that the shortage of sheet steel is so great that it would require operation for at least three years of all of steel capacity, including additional wartime facilities for production to catch up with demand.

In his opening statement to the committee, Kaiser disclosed that he would probably bid on the $93 million Chicago steel plant, built by DPC and operated by Republic Steel Corp., in an attempt to ease the shortage of sheet steel needed by his operations. Bids are to be received on this plant by the War Assets Corp. Apr. 1.

Already, he said, he had been obliged to lease an aluminum ingot plant and an aluminum rolling mill in order to obtain raw materials after being unable to obtain commitments for delivery under 48 weeks.

Despite indication that CPA will not make allocations, Kaiser also revealed that he had approached Stabilization Director Bowles with the request he study such allocation of steel as would be fair to all producers.

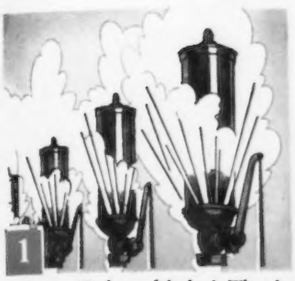
Try Yale & Towne Again

Hartford

• • • **Gov. Raymond E. Baldwin** this week will try again to get Yale & Towne Mfg. Co., management and AFL together to work out a formula for resuming negotiations toward ending the longest strike in Connecticut during the current labor uprising.

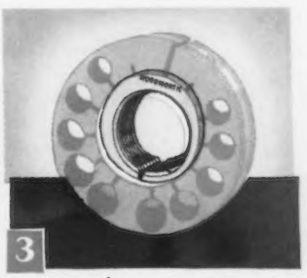
Labor has tried all sorts of stunts to win public sympathy with little or no success. To date, management has had no intention of meeting labor union representatives. It long ago adopted a sit-down strike.

Holy Smokes! They've done it again!



Blow all the whistles! They've done it again!

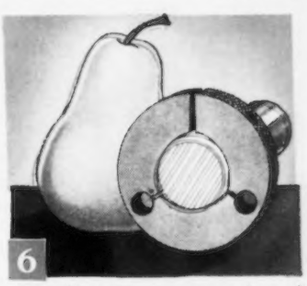
Blast out a fanfare for a great new Woodworth invention!



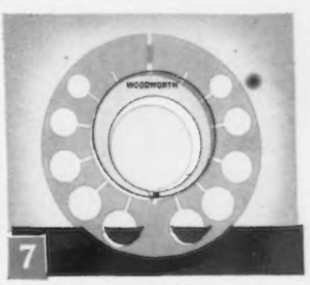
It's the Woodworth Adjustable Thread Ring Gage.

Thread ring gages check the O.D. of threaded parts.

Adjusting 'em as they wear down saves time and money.

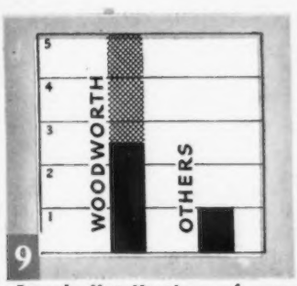


But old types get pear-shaped —lose accuracy—wear out fast.



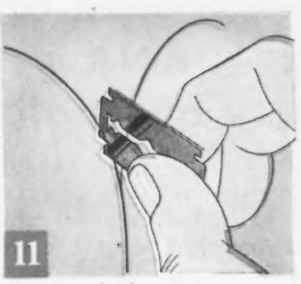
This Thread Ring Gage adjusts perfectly — *stays round.*

Never gets out of line when dropped or thrown about.



Equal distribution of wear increases life 2½ to 5 times.

Light weight reduces operator fatigue — increases sensitivity.



It's amazingly accurate . . . ideal for hair-splitting work.

Woodworth's New Thread Ring Gage is an all-time champion!

Another Woodworth contribution to production

THE NEW Adjustable Thread Ring Gage, another revolutionary Woodworth instrument of accuracy, is now available to industry!

Employing an entirely new principle of design, and proven mathematically correct by actual tests, this gage assures roundness through the maximum range of adjustment.

Check these
Five Important Advantages

1. *Greater Accuracy and Stability.* Stays round with adjustment. Threads held in alignment of thread helix angle with adjustment. Will not reject parts that should pass inspection.

2. *Longer Wear Life.* Equal distribution of wear over the full thread circumference, throughout the entire range of adjustment, increases wear life 2½ to 5 times.

3. *Less Weight.* Aluminum alloy outer body halves the weight to greatly reduce operator fatigue and increase sensitivity.

4. *Positive Identification.* Green outer body for GO GAGE and red for NOT GO GAGE saves time for operator.

5. *Positive Adjustment.* Cannot be thrown out of adjustment by ordinary blows or falls that change setting of conventional gages.

You can speed up production and decrease gaging costs on your thread inspection operations with this amazing instrument! Write for completely illustrated folder 46-R.

ACCURACY YOU W CAN TRUST

WOODWORTH

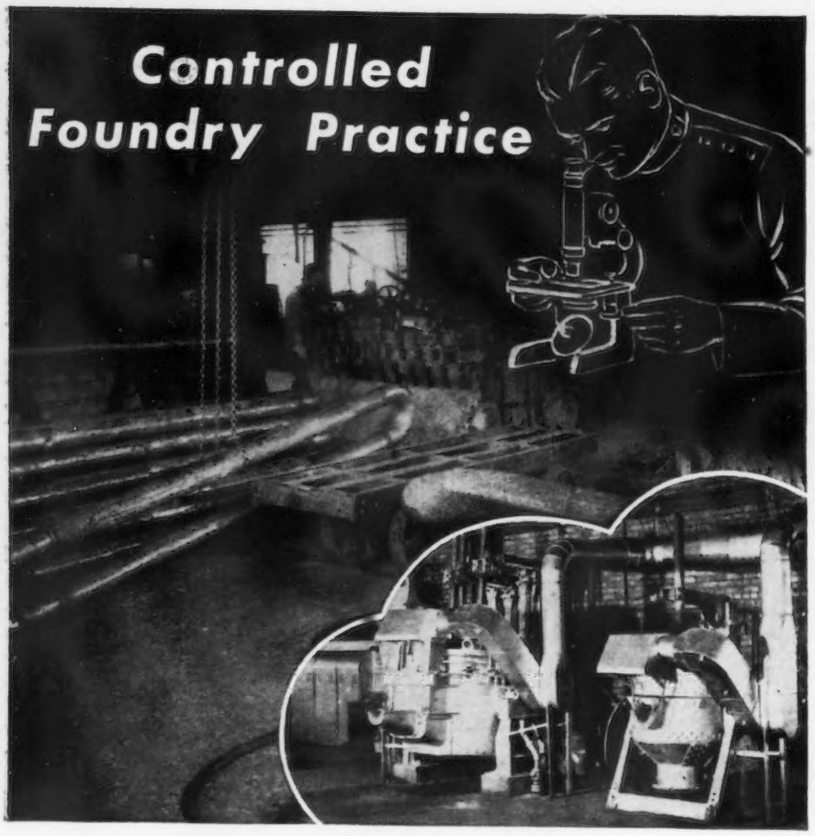
N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD
DETROIT 20, MICHIGAN

PRECISION GAGES

PRECISION MACHINED PARTS

DIAPHRAGM CHUCKS—SPECIAL TOOLS

ADJUSTABLE CLAMPING JIGS



Another Reason For MICHIANA Uniformity of Quality

The ingredients of quality are often vague but in the MICHIANA foundry they are expressible in very concrete terms—improved material control, new casting techniques and flexible production methods to meet the requirements of peace-time activities. These qualities are necessary to the successful production of heat- and corrosion-resistant alloy castings that will withstand the most severe detailed tests.

In the MICHIANA foundry, every requirement from receipt of specifications to the finished casting receives the attention of skilled metallurgists, engineers and foundrymen. Every casting must pass the rigid controls and standards established by MICHIANA throughout a long history of successful applications of science, skill and know-how.

Over twenty-five years of practical experience has built up a wide and varied store of metallurgical knowledge, and original alloy casting information. This invaluable data is fully utilized so as to afford every user of MICHIANA castings the greatest advantage in longer heat-hour service, lower costs, maximum production and improved all-round performance.

MICHIANA
Heat-Resistant and
Corrosion-Resistant
ALLOY CASTINGS

MICHIANA PRODUCTS CORPORATION
Michigan City, Indiana

Illustrated Booklet 110 available upon request. Write today.

Cincinnati Planer Co. Upholds Production With Foreign Sales

Cleveland

• • • **Bereft of crystal** ball, but backed up by a backlog of orders reported in the neighborhood of $4,500,000, George Langen, new president of Cincinnati Planer Co., believes bright prospects are ahead for the planer industry.

In an interview, Mr. Langen told THE IRON AGE that foreign business, chiefly from Russia, Finland, Sweden and France was coming in, and that the company looks forward to a sustained demand from overseas customers.

Up to the present time, Mr. Langen said, Cincinnati Planer Co., which did not use a DPC machine in its plant during the war, has not been noticeably affected by sales of government-owned machines, but in anticipation of future cooperation with customers for surplus planers, is taking out a license with War Assets Corp.

"Most of the planers in surplus have come out of isolated shops," Mr. Langen pointed out. "But," he emphasized, "we are sold on the idea that the Government should retain 75 pct of the surplus planers for any possible future emergency."

He said the company was not doing any rebuilding at the present time, since all facilities are devoted to new production, but indicated that rebuilding was a possibility later on.

In the present machine tool component crisis, there is a good chance that a shortage of motors may close the plant down temporarily some time this month. The company's supply of castings is considered adequate at the present time, but a shortage of bearings may also hit the plant within the next three or four weeks, Mr. Langen said.

Cincinnati Planer Co. was bought last week by a group headed by Sidney G. Rose, Philip L. and Ben Moskowitz in a transaction involving approximately $3,500,000. Mr. Langen, who had been vice-president, and factory manager of the company since its inception, was named president, and Mr. Rose has taken the office of chairman of the board.

During the war years, Cincin-

nati Planer Co.'s volume reached $35,000,000. The company was formed in 1898 by Bert B. Quillen, who was its president and principal stockholder until his death a year ago. Chief products of the company are double housing and open side planers, boring mills, and planer type milling machines.

About one-third of the present backlog or orders is domestic, and two-thirds foreign. The company had peak employment of 700 during the war and now has about 500 employees. The company has no union.

Stitching Steel Wire To Wood Boxes Saves Scanty Lumber Supply

Jacksonville

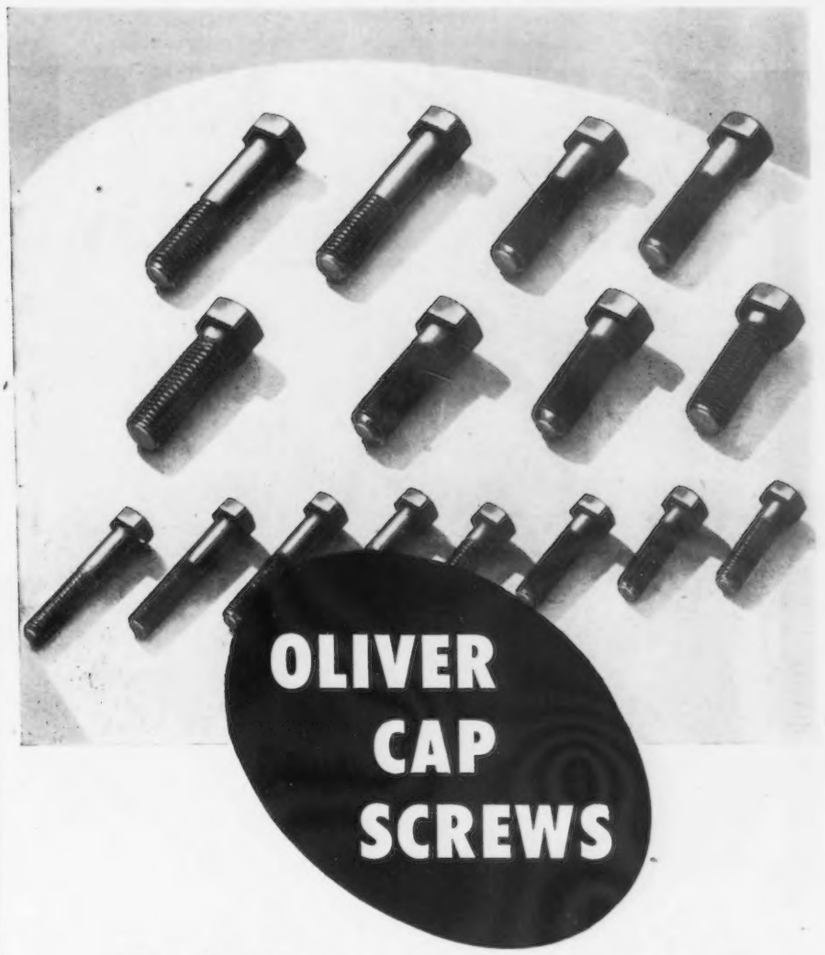
• • • **To assure shippers** of safe packing of their products and to help conserve the critical lumber supply, the Wirebound Box Manufacturers Assn. announced publication of a new minimum specifications manual.

The manual, which is the result of a year's work by the association's design, specification and quality committee, will be distributed to wirebound box manufacturers throughout the country, who volunteered at the meeting to promote the use of these specifications drawn up for the packing of nearly every type of industrial product, from light ceramics to 500-lb engine blocks.

Cooperation in meeting with these standard specifications is expected to reduce to a minimum, both shipping damage losses and overdesigning of containers — which involves use of more or heavier box veneer than necessary, L. S. Beale, secretary, explained.

These export specifications, which for the first time in a published specification made a distinction between type of loads, their shape and other characteristics, as well as their total weight, provided a background for the study of ideal container design for domestic shipments.

The "Minimum Specifications for Wirebound Boxes for Industrial Domestic Shipments" assures shippers economy of wood, as well as safe delivery, because of the use of steel wire stitched to wood of less dimension than would otherwise be required.



Made to meet your most Exacting Specifications

Accuracy and uniformity are vital qualities you need in cap screws. They must fit what they are supposed to fit, thread-in readily, draw-up tight, hold fast. Heads must be accurately formed, true and clean.

Oliver Cap Screws meet your most exacting specifications. Made by one of the oldest and largest manufacturers of industrial fasteners, they are widely used and preferred.

You make no mistake when you buy OLIVER.

OLIVER IRON AND STEEL Corporation

SOUTH TENTH AND MURIEL STREETS, · PITTSBURGH 3, PA.

PAGE *for* WIRE

—HAVE IT YOUR WAY

Wire for production—that has been a Page specialty for many years. If you know what you want, Page probably has it or can make it for you. If you are not sure, Page will make a recommendation. For wire or information about the best use of wire, get in touch with Page.

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

Allis-Chalmers Book Reveals New Services Granted to Customers

Milwaukee

• • • **Samples submitted** by customers are tested for adaptability to induction heating in a new laboratory established by the Allis-Chalmers Mfg. Co., the company's 1945 Engineering Review soon to be released, reveals.

The use of high power vacuum tube oscillators for frequencies of about 400,000 cycles per sec, forms the basis of Allis-Chalmers activity in induction heating equipment. The new 50 kw electronic induction heater features a high voltage rectifier, six-phase with filament voltage supplied by six separate filament transformers and a vacuum switch for direct control of power switching in the grid circuit. Heavy duty industrial service is provided by 100 kw units, which yields the greatest efficiency for a vacuum-tube heater, according to the Review. It usually employs additional timers and control for specific installations. A production line for induction heaters is expanding at Allis-Chalmers.

Allis-Chalmers is also entering the induction melting furnace field and has designed furnaces for capacities of 500, 1000 and 2000 lb. These furnaces, the Review points out, are completely factory assembled units and are equipped with tilting-motor and control to regulate pouring of molten metal into ladles or molds.

Standard mercury arc induction heating equipment supplied for melting alloy steels includes ac switchgear, transformers and mercury arc converters with control, the Review relates. In some applications, the ac switch gear and transformer equipment have been designed for direct connection to 6900 v, 4160 v, or 2300 v, ac power systems. The mercury arc converter equipment can take three-phase power from the power lines at any supply system voltage and convert it into single-phase power at a frequency of about 1000 cycles per sec and at any desired voltage for operation of induction heating coils or induction melting furnaces.

According to the Review, steel plants requiring a limited amount

of 250 v general purpose power in one location are successfully applying the sealed Excitron unit-substation type of rectifier. Where larger concentration of dc power is called for, the pump-evacuated Excitron is being applied.

Lead oxide production by a new method is aided by oxidation units produced by Allis-Chalmers, the Review states. Two units installed at a mid-western plant for this process are all welded mills, 4½ ft in diameter by 10 ft long, arranged for speed reducer drive with 100 hp motors. Main bearings are water cooled. Cast lead slugs, about 1¼ in. in diam, are charged into the mill trunnion, consisting of a slug-elevator and rotary mechanism. Air heated to about 140° F is blown into the mill through an air heater equipped with 16 nozzles where it oxidizes the surface of the lead balls. Tumbling action of the rotating mill abrades oxidized slug surfaces, thus exposing new surfaces to be oxidized. Action is continuous until the slug is oxidized.

The lead oxide abraded from the slugs is drawn out of the mill for separation and filtering, resulting in a blended product about 5 to 8 pct plus 325 mesh, and containing from 60 to 75 pct litharge with balance of sub-oxides. Control of the air temperature and grade of product is a critical factor in the process.

Plans 18-Mile Pipeline

Buffalo

• • • **The Iroquois Gas Corp.** and United Natural Gas Co. have announced plans to construct 18 miles of 16-inch pipeline from the Pennsylvania State Line to Little Valley, N. Y., at an estimated cost of $465,000. Work is expected to start in April and completion is scheduled by the end of July. Both are wholly-owned subsidiaries of the National Fuel Gas Co.

The Iroquois company has four principal gas lines between Buffalo and Little Valley and three between Little Valley and the Pennsylvania line. The new section is designed to remove an existing bottleneck and increase the maximum volume of gas brought into Buffalo by 25 to 50 pct.

United and Iroquois have filed a joint application with the Federal Power Commission for authority to build the new section.

Venturi Tubes for steam ejecting

Among the equipment needed in the construction of a chemical plant were several Venturi tubes of acid-resistant metal. Ampco Metal, Inc. made the body of Ampco Grade 15 sheet, the flange of Ampco Grade 16 (centrifugally cast), welded them with Ampco-Trode 10, and machined the flange surface . . . all in one plant . . . for a highly satisfactory corrosion-resistant assembly.

. . another Ampco service!
For corrosion-resistant assemblies, fabricate with Ampco Metal . . . weld with Ampco-Trode

AMPCO Metal
The Metal without an Equal
Reg. U.S. Pat. Off.

Specialists in engineering—production — finishing of copper-base alloy parts.

If corrosion is one of your important problems, follow this time-tested and well-recommended procedure — *fabricate with Ampco Metal* and *weld with Ampco-Trode.*

In one completely-equipped and self-contained plant, Ampco Metal, Inc. can fabricate assemblies and sub-assemblies that resist corrosion, wear, impact, fatigue, erosion, abrasion, and cavitation. This time-and money-saving Ampco service merits your immediate investigation.

Experienced users tell us Ampco Metal lasts several times as long as ordinary bronzes under difficult conditions. Use this fact to your advantage. Ask Ampco engineers and production specialists to help you adapt fabricated assemblies of Ampco Metal to your requirements. Send us your prints for suggestions.

Write for bulletins.

AMPCO-TRODE

Ampco Metal Inc.
Department IA-3 Milwaukee 4, Wisconsin
Ampco Field Offices in Principal Cities

A-25A

HIGH-SPEED GRINDING

The new Electro High-Speed Grinding Wheels offer faster cutting without troublesome heat development whether for snagging or precision operations, of which Electro's latest development is the resin-bonded Electro Cut-Off Wheel.

We believe that war demands made it possible for ELECTRO to show cooler cutting at higher speeds . . . and present high state of perfection will be the basis for further gains.

Most all sizes and types of Electro resin-bonded wheels are available from our Buffalo or Los Angeles Warehouses.

All we ask is opportunity to prove the cooler cutting at higher speeds of Electro Wheels. Tell us what you want to grind or cut-off and we will supply recommendations and prices. Newly printed Handbook-Catalog No. 645 is available.

Will you wire us?—or phone us at Buffalo, WASHington 5259.

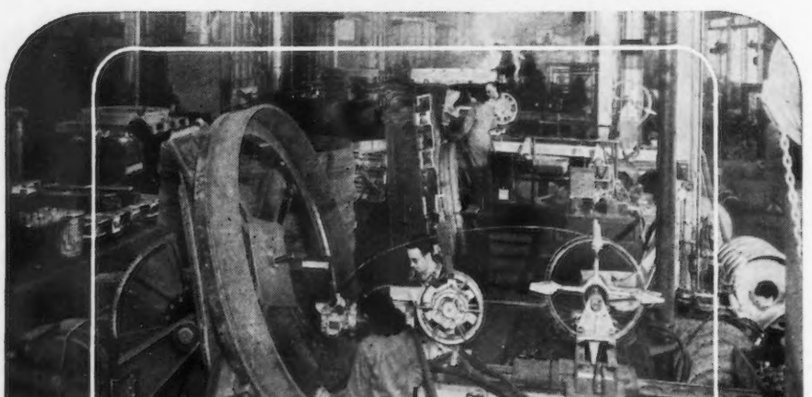
Electro SINCE 1919

K-314

Electro REFRACTORIES & ALLOY CORPORATION

MANUFACTURERS • CRUCIBLES • REFRACTORIES • GRINDING WHEELS

344 DELAWARE AVENUE BUFFALO 2, NEW YORK



Setting new standards in production welding

Matching their important contribution to faster production welding for war, C-F Welding Positioners are setting new standards in post-war welding practice. Shops already equipped with C-F Positioners are pacing the field in the race for new markets.

Equipped with variable speed control in any practical speed ratio, from 0 RPM and up, for handling circular or peripheral welds, C-F Positioners are speeding production welding practices everywhere. Speed selection is fast, easily made, permitting quick change-over of material being welded.

C-F Positioners as production tools are changing welding practice from slow, costly operations to faster, better automatic downhand welding. Cost of welding footage is reduced, "overwelding" is eliminated and machine or operator capacity is materially increased. There are hand or power operated C-F Welding Positioners in capacities from 1200 to 30,000 lbs. Write for illustrated bulletin WP 22. **Cullen-Friestedt Company, 1303 South Kilbourn Avenue, Chicago, Illinois.**

C-F positioned welds mean better, more economical welds

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

Chesapeake & Ohio RR To Merge with Pere Marquette Railroad

Cleveland

• • • **Boards of directors** of the Chesapeake & Ohio railway and the Pere Marquette railway have unanimously approved and signed an agreement of merger embodying the terms and conditions for uniting the two roads, naming Robert J. Bowman to be president of the combined C&O - Pere Marquette upon consummation of the merger program. Mr. Bowman succeeds Carl E. Newton, who last month announced his resignation as C&O president.

Mr. Newton's resignation will become effective at the annual meeting of the company Apr. 23, at which time the merger agreement will be submitted to C&O stockholders.

Mr. Bowman and Robert W. Purcell, vice-president and general counsel, have been elected to the C&O board. The board also named candidates as directors to be presented to the stockholders for election at the annual meeting of the company. Mr. Newton requested that his name be withdrawn from nomination to the new board. With this change and the addition of Messrs. Bowman and Purcell, the new board will include all present incumbents.

Application will be filed with the Interstate Commerce Commission for authority to weld the roads together as constituents of an enlarged C&O system. Stockholders of the C&O railway will vote on the merger at their annual meeting in Richmond, Apr. 23, and the Pere Marquette stockholders, at their meeting in Detroit, May 7.

The system created by the merger would total approximately 5000 miles of main line mileage. It would embrace lines from Newport News and Washington, via Columbus, to Toledo, and, via Cincinnati, to Chicago, and a line, north of Lake Erie, from Buffalo into Michigan. Throughout the lower Michigan peninsula the Pere Marquette forms a veritable filigree of rails, linked by carferry service with the west shore of Lake Michigan, where traffic is interchanged with carriers serving the northwest.

Dollar Shortage Does Not Hinder Liquidation Of European Surpluses

(CONTINUED FROM PAGE 118)

to make arrangements to have the material delivered.

In addition to functioning as a supermarket for Eurasia, the OFLC also carries regularly some OPA functions, in rationing the most critical items among the many buyers. Despite the above-mentioned reluctance to enter into wholesale buying, when items such as tractors do appear, an avalanche of orders follows. In all such cases the sales group institutes an allocations system to spread the available goods among the most needy. Two international economic bodies which were set up in 1945 with offices in London aid the commissioner in determining what allocations should be made.

As can be seen in the accompanying map, the greatest concentration of U. S. surplus goods to be found in Europe is in depots located in the north of France. The general buying position of France is therefore one of prime importance to the OFLC. Handling the direct contacts with the French Allied Surplus Council, which is the designated government group for purchases, is J. G. Forbes, an American with years of international banking experience, many of them spent in France.

In his efforts to dispose of the surplus material he maintains constant liaison with the council, keeping it informed as to the nature of all offerings. The French have accumulated a substantial dollar balance through troop payments and other costs of the war, but are conserving it for darker days ahead. The change of governments in France has not changed this policy as all the political factions are determined that the foreign exchange must be used only for absolutely essential items.

Even restricting sales to absolute necessities, France has to date bought more than any other European country, with sales to date totaling $12,400,000, excepting a recent bulk transfer to Italy. Considerable of this French expenditure was to cover the cost of certain raw materials that were

CUTTING COSTS of metal cutting operations with

RUTHMAN GUSHER COOLANT PUMPS

Ruthman Gusher Coolant Pumps offer you specific advantages and economies in your metal cutting operations.

They are efficient, respond quickly and deliver a copious flow of coolant from a trickle to full volume. Economical to operate, they use less power when throttled, do not build up pressure. Their simple design, full ball bearing construction and the vibrationless rigidity of the shaft saves wear and assures you of years of trouble free operation.

So when you want economy in your coolant system be sure to insist on Ruthman Gusher Coolant pumps on your machines.

Write for our new condensed catalog

THE RUTHMAN MACHINERY CO.

1821 READING ROAD CINCINNATI 2, OHIO

THE "GUSHER"

A MODERN PUMP FOR MODERN MACHINE TOOLS

Factors that Determine "HERCULES" Red Strand WIRE ROPE Quality

PLANNING • RESEARCH • TESTING TO MAINTAIN HIGH STANDARDS • MANUFACTURING FACILITIES AND EXPERIENCE

As it is difficult to point out which is the most important leg of a three-legged stool, so it is hard to say which of these factors is the most vital... we know from experience that *all* are necessary. Proof of wire rope quality is in performance... why not find out for yourself just what "HERCULES" can do on your own job? Many who have made this test are now regular users.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS
5909 KENNERLY AVENUE
ESTABLISHED 1857
ST. LOUIS 12, MISSOURI, U. S. A.

NEW YORK 6 . . . 90 West Street
CHICAGO 7 . . 810 W. Washington Blvd.
DENVER 2 . . . 1554 Wazee Street
SAN FRANCISCO 7 . . 520 Fourth Street
PORTLAND 9 . . 914 N. W. 14th Avenue
SEATTLE 4 . . . 3410 First Avenue South

NATIONAL AIROIL BURNERS
for FUEL OIL . . . for GAS

LOW AIR PRESSURE OIL BURNERS

"For *all* types of industrial furnaces"

USE LIGHT OR HEAVY OIL AND GET EFFICIENT COMBUSTION
WITH THIS *LOW AIR PRESSURE* OIL BURNER

This burner—our type LAP—is designed especially for firing heat treating, forging and other metal working furnaces. Simple in operation and ruggedly constructed, it is free from clogging and requires only minimum maintenance.

The LAP burns No. 1 to No. 6 fuels efficiently, using low air pressure for atomization. It is available in various capacities. Get bulletin 65 for further details.

NATIONAL AIROIL BURNER Company, Incorporated
1271 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PENNA.
Texas office: 2nd National Bank Bldg., Houston
OIL BURNERS • GAS BURNERS • GAS PILOTS • PUMP SETS • EXPLOSION DOORS
ACCESS DOORS • AIR DOORS • BURNER BLOCKS • FURNACE OBSERVATION WINDOWS

in work in French factories when the war ended. For example, quantities of both steel and cotton were in the process of fabrication to American Army orders in French mills, and were subsequently bought by France.

In the sale of other items, when Mr. Forbes submits the listing of a new bargain to the French surplus council, the catalog is translated, and passed on to the government ministry appropriately interested. Regardless of how badly a ministry may want particular items, the final approval of the Minister of Finance must be obtained. In general this department simply does not approve.

In a technical sense, an individual French businessman may through his government make a purchase. The path he follows in such a case, however, is long and arduous. He must go through the official trade association of his field (Office Professionelle), who channels the request into the government agencies. The system is deliberately complex, again because the policy is to discourage such dollar expenditures.

In the transport field, where France's need is most acute, the buying is making some progress, but is also drawing some criticism from the French press. In line with the careful scrutiny of all purchases, the French government recognizes that the American motor vehicles designed for the war are not ideally suited to commercial operations. Generally speaking they use too many tires (ten on most trucks) and too much gas on road operations. The gas consumption is a natural outgrowth of the fact that judged from commercial standards the war vehicles are all greatly overpowered.

Although the French bought 6000 trucks under the lend-lease program, they will doubtless acquire more. They are not contemplating any large jeep purchases, as they feel that except for the few purposes for which it is designed, the jeep too is an uneconomical vehicle. As is the case with every other country, France is quite willing to buy every tractor that it can lay its hands on.

The whole railway rolling stock picture for the Continent is currently being studied by the European Central Inland Transport Organization which was established last year and meets in Lon-

don. There are so many facets to the picture that the OFLC depends heavily upon the advice of the organization in the proper allocation of rolling stock.

War damage, reparations, gage conversions made during the war, homing, new construction, and repairs are all being studied at the present time. In the locomotive line, however, there is an anomoly in the existence of several hundred American Army units brought over for the invasion which have not been sold. They are at present in use on the French railroads in an army pool, but would be withdrawn for delivery if a buyer were present. In the meantime, France is buying new from American builders locomotives to take the place of this equipment.

The French position is that the Army locomotives are too light, do not come up to their own combustion standards, are not economical coal burners, and have too many gadgets on them. In place of them the French want big locomotives which will take express freight and fast passenger services to make their roads competitive in the postwar rush for business.

The defense for the present position is the French estimate that about 10 pct of present rail business is U. S. Army business, and the locomotives make up about 10 pct of the present pool available for use. Whether the figures are strictly accurate or not, would be hard for any outsider to determine, but they represent the official French viewpoint at present.

The complex French import and export tax regulations complicate the resale of any surplus that is bought to the ultimate user. For this reason there is no attempt to establish any relationship between the purchase price and the sale price. For example the present rate of exchange tends to favor the importer, but renders operations difficult for the man who manufactures in France and sells in the export market. When the French government is doing all of the importing, as now, the theory is that by levying on the resale of imported goods a sufficient amount it is possible to adjust for the losses of the exporter.

The result is that an American truck may be bought as surplus by the official French government buying agency for one price, and immediately resold to a French

THIS TOOL MAKES Horsepower OUT OF Manpower

Multiplies 50 pound Pressure at the grip of the handles to approximately 4,000 pounds at cutting jaws to

CUT

BOLTS • RODS
WIRE • CHAIN
CABLE • FLAT STOCK

. . . on the job. Quick, durable, efficient. Used all over the world, 65 years of specialized experience in the making. Sold wherever mechanics' tools are sold. Write for illustrated catalog.

PORTER CUTTERS For Metals

H. K. PORTER, INC., BOSTON 49, MASS.

IF THERE IS A FLAW
"FLASH-O-LENS"
WILL FIND IT!

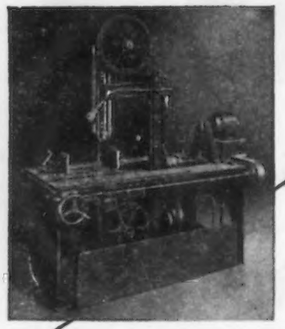
The new FLASH-O-LENS offers foundry-men, machinists, and many others engaged in producing metal parts an efficient, economical means of examining the most minute defects during routine inspections.

FLASH-O-LENS consists of a portable 40x microscope combined with a perfect source of illumination in one convenient, compact unit . . . They are available in several models—powered by either standard flash light dry cells or by current from any AC or DC outlet—and with a selection of various combinations of lenses, all interchangeable in the one lens housing.

Send today for illustrated catalog M describing the new FLASH-O-LENS

E. W. PIKE & COMPANY
Manufacturers of Illuminated Magnifiers

PIKE
REG. U.S. PAT. OFF.
ELIZABETH 3, N. J.



No other saw can do as much!

No Other Saw Can Do As Much! MARVEL Universal Band Saw, 18" x 18" capacity, will cut-off, slot, trim, miter, notch, rough-out, or split bar stock, pipe, structural sections, mouldings, tubing, large standard blocks, or small irregular shapes with speed, ease, and convenience. Few shops working with metal can afford to be without this most versatile of all saws.

MARVEL SAWS

Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. No change required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw." There is no other machine like the No. 8 MARVEL.

Complete Range of Metal Sawing Machines
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

ARMSTRONG-BLUM MFG. CO.
5700 Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

farmer for 10 or 20 times that price.

A reversal of French policy has darkened the prospects of selling most of the surplus transport aircraft located in Europe, but this type of plane remains one of the easiest items to dispose of. With the assistance of the Air Forces in inspection, maintenance and delivery, 109 have already been sold, and disposal officials feel confident that all of the C-47 Douglas transports that become available will be sold.

Originally the French government indicated that it wanted to buy 200 of this type, but when the final decision came to the Finance Minister he declined. The sales that have been made to date have been in much smaller quantities, but are proceeding at a brisk rate. In contrast to other sales where the delivery after the sale is a major problem, the airplanes which are sold often move faster than their paperwork. The surplus craft are all located in the American zone of Germany where only American pilots are authorized to fly, so AAF pilots undertake the delivery, at the Army's risk.

Backlog Tops $3 Million

Boston

• • • **Van Norman Co.** of Springfield had unfilled business on its books at the close of 1945 exceeding $3,000,000, which was about evenly divided between machine tool and automotive service equipment. Although individual orders are not large, the company is doing business with Russia, France, Czechoslovakia, Africa, Brazil and Argentina.

For 1945, the company showed a net profit of $296,520, equal to $1.24 a share on its 240,000 outstanding common shares. In 1944, the company earned a net of $317,482, or $1.32 a share.

Buys Modern War Plant

Providence

• • • **Unable to secure** suitable land here for a new plant, the American Screw Co. has purchased a modern plant in Willimantic, Conn., owned by the government and operated during the war by a branch of Pratt & Whitney Aircraft Corp. at a price of $2 million.

Gallup Polls

(CONTINUED FROM PAGE 119)

The question in Britain:

"Do you approve or disapprove of our accepting the loan?"

	Pct
Approve	50
Disapprove	17
Undecided	5
	72

Field reporters in the United States also asked those who said they had followed the discussions what they considered to be the best arguments in favor of granting the loan and the best arguments against making the loan, as follows:

(1) "What do you think is the best argument in favor of granting the loan?"

It will promote world trade and stimulate business within the United States	16
England is still suffering from the war and is badly in need of the loan	7
We should make the loan in the interests of a good neighbor policy	4
England is our ally, and important to us as a first line of defense in Europe	4
Miscellaneous replies	5
No answers	28
	*64

(2) "What do you think is the best argument against granting the loan?"

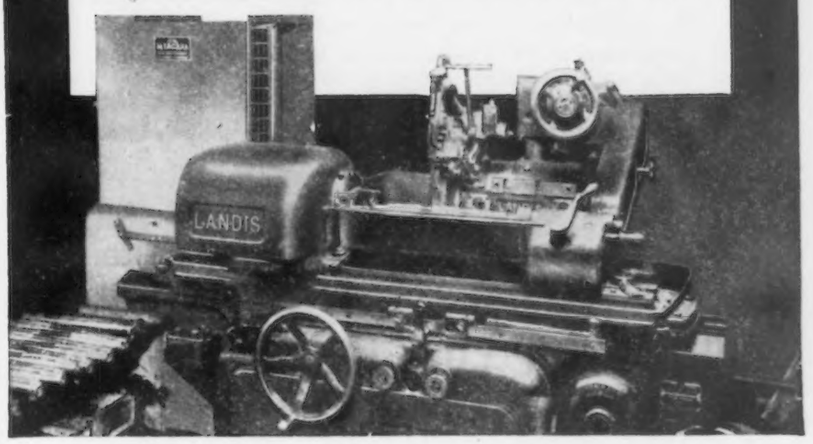
	Pct
Britain won't pay the loan back	28
U. S. needs the money itself	6
We've already given Britain too much	4
England doesn't need or want the loan	2
England will use the loan to further her own interests and against the U. S.	2
The loan will increase our already heavy tax burden	1
Miscellaneous	4
No answer	17
	*64

*Totals are greater than 57 pct because some gave more than one answer.

In Britain, those who disapprove of England's accepting the loan cite as their main objections that the interest rates are too high, that England should remain independent in financial matters, that acceptance of the loan would mean England would owe money to the United States for many years.

WOULD MORE PRECISE TEMPERATURE CONTROL OF LIQUIDS OR GASES

IMPROVE YOUR PROCESS OR INCREASE YOUR PRODUCTION?



The NIAGARA AERO HEAT EXCHANGER holds the temperature of a liquid or gas within close limits. Many units have been installed because they provide a less expensive and less troublesome way of cooling fluids in an industrial process. But, after installation, users have discovered additional benefits of extra plant capacity, increased production and better quality production because the NIAGARA AERO HEAT EXCHANGER provided accuracy of temperature control.

Cooling of cutting oils, lubricants, quenching baths, engine jacket water; chemicals and intermediates; electronic sets; condensing gases, steam and refrigerants; controlled atmosphere processes; compressed air after-cooling—are processes in which these *extra* benefits are obtained.

For further information, write for Niagara Bulletins 90, 94 and 96, or ask about experience in your own field.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

DEPT. IA-36, 6 E. 45th St. NEW YORK, 17, N. Y.

Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

"1846—One hundred years of continuous service to industry—1946"

A.I.S.I. HY-TEN S.A.E.

ALLOY STEELS FOR RECONVERSION

To take advantage of up to the minute development in the metallurgy of steel before improvements can be incorporated in the natural course of events in standard steels, specify HY-TEN STEELS.

Immediate shipment from seven conveniently located stocks.

Data sheets gladly mailed on request.

"THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW"

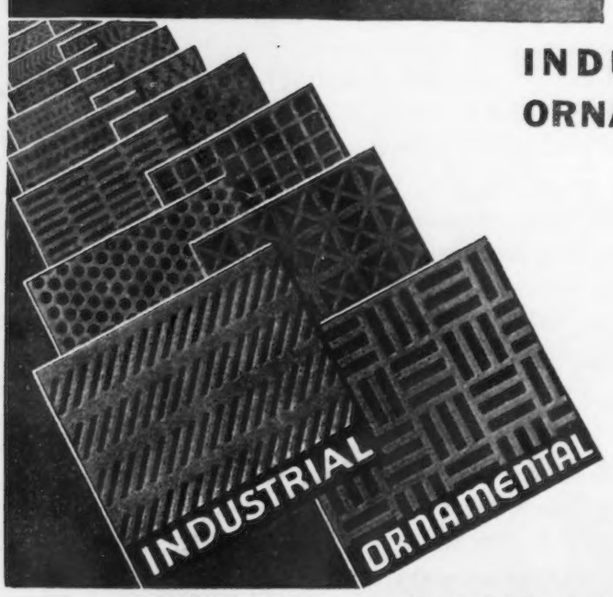
WHEELOCK, LOVEJOY & CO., INC.

126 Sidney Street Cambridge 39, Mass.

Cleveland 14 • Chicago 23 • Newark 5 • Detroit 3 • Buffalo 10 • Cincinnati 32

PERFORATED METALS

INDUSTRIAL
ORNAMENTAL



ANY METAL ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO 44, ILL.
Eastern Office: 114 Liberty Street, New York 6, N. Y.

Would Choose It Again Railroad Workers Say In Recent Opinion Poll

• • • **Employees of the American** railroads like their work well enough so that, if they were beginning their careers all over again, five out of eight of them would once more make railroading their first choice as a vocation. At the same time, the railroaders have a greatly exaggerated idea of the earnings of their industry—their average (median) estimate of its 1944 profits being 27 pct, whereas Interstate Commerce Commission figures show the earnings on the investment in railroad property in that relatively prosperous year to have been only slightly more than 4 pct. The survey was conducted by the Opinion Research Corp. of Princeton, N. J., for the magazine *Railway Age*, which has published the results in an article in its current issue.

Sentiment among railroaders in favor of government operation of the railroads in peacetime is disclosed to be practically non-existent, the survey showing only 3 pct of the employees favoring such an innovation. As for wartime nine out of ten employees believe that the railroads did the best job that they could have done during the recent conflict; and two out of three railroaders assert that the government would have done a worse job if it had taken over the carriers as it did in World War I.

To ascertain the degree of contact existing between the top management of the industry and the employees, canvassers asked the railroaders to name the rank of the highest officer of their company with whom they were acquainted, and 30 pct mentioned a president or vice-president, while an additional 44 pct mentioned other officers from the grade of superintendent up to that of general manager. Nine out of ten employees reported a favorable impression of the highest officer of their companies who was known to them personally, and two thirds of them rated their foreman or other immediate superior favorably. Only one employee in 20 expressed a definitely unfavorable opinion of his foreman.

The employees' estimates of the industry's profits varied from less than 5 pct to more than 75 pct

during the "past year" (the canvass having been made in December 1945), with a median average of 27 pct. Likewise, in their opinion as to the distribution of the railroads' revenue dollar, a majority of the employees either did not know whether the stockholders or employees got the larger share, or believed that the stockholders' share was the larger. ICC figures indicate that, in 1944, almost 41 pct of railroad revenues were paid out in wages, while the stockholders received only slightly more than 3 pct in dividends. Bearing further on the employees' ideas of the part played by capital investment in the provision of railroad service, their average (median) estimate of the capital investment per employee was $9300—or just about one-half what ICC figures show the capital investment per employee actually was in 1944.

In their opinion of what a "fair wage" for capital invested in railroads should be, the employees were generous—their average (median) opinion being 10 pct on the capital investment, or considerably more than double what actual 1944 earnings were.

On the matter of prospective competition from other forms of transportation, two employees out of five are apprehensive. Two out of three employees believe the railroads are inequitably taxed as compared to their rivals. A substantial majority, nevertheless, believes the railroads have as good a chance as any of their rivals to operate at a profit.

FISSION DOWN UNDER: *Reminiscent of the days of the Gold Rush is the prospecting for fissionable material carried on by the various governments. Australia's search has yielded what is said to be richest deposit of uranium in the world. Samples sent to Britain yielded 3 pct of uranium from this source.*

in the days ahead . . .

You can use these modern

Fort Pitt Bridge Facilities

Engineers, Fabricators and Erectors of Riveted and Welded Structural Steel for:

- Railroad and Highway Bridges
- Public Buildings
- Demountable Bridges
- Power Houses
- Industrial Buildings
- Military Trestles
- Commercial Buildings
- Ship Weldments
- Concrete Reinforcing Steel

Engineers and Manufacturers of:

- Combustion Systems for Industrial Furnaces

for . . . Pressing and Welding of Heavy Plate Sections

STEEL PERMITS STREAMLINING CONSTRUCTION WITH SAFETY, ENDURANCE AND ECONOMY

FORT PITT BRIDGE WORKS

Member American Institute of Steel Construction

GENERAL OFFICES: 212 WOOD STREET
PITTSBURGH 22, PA.

HANNATEN IRON INGOT
10 POUNDS

GRADES:
BASIC
SILVERY
FOUNDRY
MALLEABLE
FERRO-SILICON

BRANDS:
SUSQUEHANNA
BUFFALO
DETROIT

Smaller . . . easier to handle . . . finer grain structure . . . more adaptable to the varied requirements of foundry operation. That's the new HannaTen ingot, produced in all grades of Hanna iron. Take advantage of this important development to attain more uniform distribution in the melt, to assure more accurate control of composition. It's another great Hanna "first."

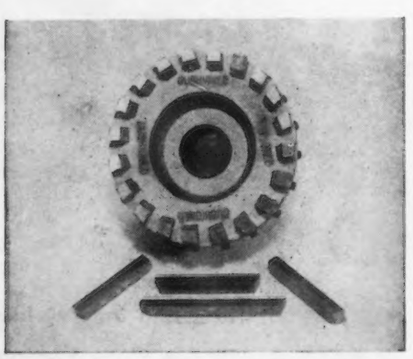
The Hanna Furnace Corporation

Merchant Pig Iron Division of National Steel Corporation

BUFFALO · DETROIT · NEW YORK · PHILADELPHIA · BOSTON

. . . THE BEST KNOWN NAME IN IRON

A Revolutionary Development In Milling



The outstanding performance attained with "CUSHIONED" 12% Cobalt High Speed Steel bits for general purpose tools naturally led to the application of this same "CUSHION" principle to Milling Cutter Blades.

Actual results with the "CUSHIONED" Milling Cutter Blades have been even more remarkable than in the case of the "Cushioned" H.S.S. Bits.

For example: Using a 6" diameter cutter with 20 teeth we are milling a steel (similar to SAE 4150) attaining a stock removal at the previously unheard of rate of 4½ cu. in. per horsepower per minute.

And it will handle harder materials than has heretofore been possible. We have milled up to 600 Brinell with surprising speed.

Blades are from 66 to 69 Rockwell "C" hard.

Write for Details

GENERAL TOOL & DIE COMPANY Inc.

555 Prospect Street East Orange, N. J.

Phone: Orange 5-2500

M. A. Hanna Reports Highest Net Income In Firm's History

Cleveland

• • • **M. A. Hanna Co.** has reported net profit for 1945 of $4,813,944, highest in the company's history, and increasing possibilities for the development of important iron ore deposits in Labrador and Quebec.

At the same time, M. A. Hanna Co. is participating with other companies in a broad program to develop new methods of beneficiation of the large tonnages of low-grade ores found in the Lake Superior district.

G. M. Humphrey, president of M. A. Hanna Co., in his annual report said that the exploration the company has been conducting for several years in association with the Hollinger Consolidated Gold Mine interests in Labrador and Quebec continues to develop favorably.

"We have discovered large surface showings of very high grade iron ore which we now propose to drill extensively."

In January 1945 the M. A. Hanna Co. acquired a 60 pct stock interest in the Evergreen Mines Co., producer and seller of Lake Superior iron ores with properties on the Mesabi and Cuyuna ranges, and took over supervision of the management of its operations.

In addition to increasing its own research activities in various fields, M. A. Hanna Co., with two other coal companies and seven railroad systems, is sharing an important study for improvement of coal burning motive power, and is also a party to the research laboratory and development programs of both Anthracite Industries, Inc., and Bituminous Coal Research, Inc.

Net profit of $4,813,944 after all expenses and taxes, including federal income taxes of $1,197,901, is equal to $4.26 a common share, and compares with $4,122,287, or $3.51 a common share, in 1944.

Preferred stock dividends of $4.25 a share totaling $425,821, and common stock dividends of $2 a share totaling $1,980,915, were paid, leaving a balance of $2,407,208 to be added to surplus.

Late in 1945 the Hanna Co. be-

came the largest single stockholder in the newly-formed Pittsburgh Consolidation Coal Co., the largest commercial coal producer in the world, with 43 mines, capacity of 20,000,000 tons a year, and reserves of over a billion tons of unmined coal. This came about through the merger into the Hanna Co. in December of Bessemer Coal & Coke Corp., which had owned about one-half of the stock of Consolidation Coal Co. when that company was combined with Pittsburgh Coal Corp. in November to form Pittsburgh Consolidation Coal Co.

"We believe this is a constructive forward step in the coal business and that it will be helpful in meeting the many problems which confront the industry," Mr. Humphrey said.

Reporting on changes in investments during the year, Mr. Humphrey referred to the purchase in January, 1945, of 58,000 shares of common stock of Durez Plastics & Chemicals, Inc., a manufacturer of phenolic plastics and related chemicals, the principal ingredients of which are coal derivatives. In September, the Hanna Co.'s stock interests in Pittsburgh Coke & Chemical Co. and in Great Lakes Steamship Co. were sold to Pittsburgh interests which already had substantial holdings in both companies.

Mr. Humphrey reported to stockholders that in 1945 the company was directly responsible for the management of three anthracite mines in Pennsylvania, nine bituminous coal mines in Ohio, 21 iron ore mines in Minnesota, Michigan, New York and Missouri, and 14 steamships carrying iron ore, coal and grain on the Great Lakes. Tonnages compared with the preceding year are as follows:

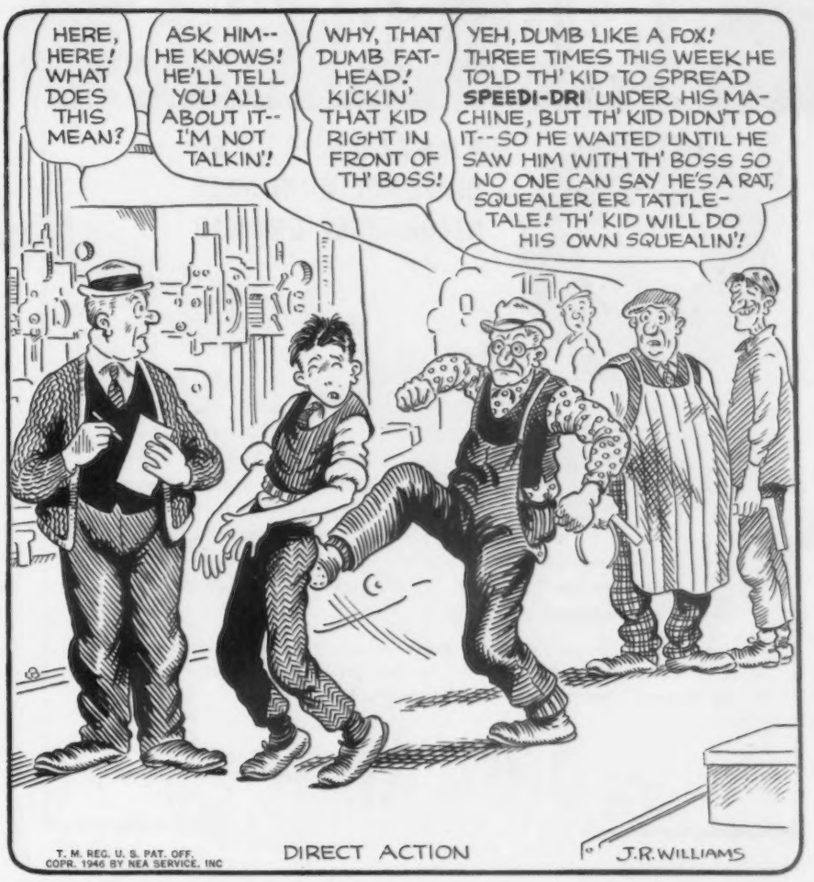
	1945	1944
Anthracite	3,056,000	3,591,000
Bituminous production	6,013,000	5,883,000
Other bituminous tonnage, including coal handled as Agent and Lake Forwarder	11,576,000	12,854,000
Iron ore	9,296,000	7,207,000
Total tonnage	29,941,000	29,535,000

•

Cleveland

• • • Reports of large reserves of high grade iron ore in Labrador were brought into sharp focus in April, 1945, when Dr. J. A. Retty, chief geologist of Labrador Min-

OUT OUR WAY


HERE, HERE! WHAT DOES THIS MEAN?
ASK HIM-- HE KNOWS! HE'LL TELL YOU ALL ABOUT IT-- I'M NOT TALKIN'!
WHY, THAT DUMB FAT-HEAD! KICKIN' THAT KID RIGHT IN FRONT OF TH' BOSS!
YEH, DUMB LIKE A FOX! THREE TIMES THIS WEEK HE TOLD TH' KID TO SPREAD SPEEDI-DRI UNDER HIS MACHINE, BUT TH' KID DIDN'T DO IT--SO HE WAITED UNTIL HE SAW HIM WITH TH' BOSS SO NO ONE CAN SAY HE'S A RAT, SQUEALER ER TATTLE-TALE! TH' KID WILL DO HIS OWN SQUEALIN'!
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC
DIRECT ACTION
J.R.WILLIAMS

Men who work with machines *like* SPEEDI-DRI . . . they *know* the danger present when floors are glaze-slick with oil- and grease-deposits, just waiting for an unwary step. They like SPEEDI-DRI because it lays a carpet of safety underfoot . . . making all types of floors safe for walking, safe for working. And when SPEEDI-DRI is swept-up, it takes with it all grease- and oil-sludge. In time, it will bring up even ancient deposits . . . leaving floors as clean as an old maid's kitchen.

In addition, SPEEDI-DRI . . . the granular, oil-thirsty absorbent . . . is economy-wise! No complicated machinery . . . no trained personnel . . . is required to apply SPEEDI-DRI. Because *one* man can do all the work necessary with SPEEDI-DRI, it releases cleaning-personnel for other, more productive work. It pushes production *up*, by keeping men on the job . . . free from the hazards of slips and falls. In addition, SPEEDI-DRI reduces the danger of flash-fires . . . for SPEEDI-DRI will not readily burn, even when oil-soaked!

SUPPLIERS:

East — Safety & Maintenance Co., Inc., New York 1, N. Y.

South, Midwest & West Coast — Waverly Petroleum Products Co., Philadelphia 6, Pa.

Get the full story of SPEEDI-DRI today. Just write "SPEEDI-DRI" on your letterhead or business card for complete details and a free, generous sample.

SPEEDI-DRI

OIL AND GREASE ABSORBENT

OHIO SHEARS

SPECIAL STEEL
UNIFORM HARDNESS
ACCURATELY GROUND

O. K. SOLID STEEL SHEAR BLADES for maximum toughness and keen edge holding qualities. Recommended for heavy plate work. Made in 3 grades suitable for all jobs: O. K. BATTLE AXE for shearing up to and including ¼ in. mild steel or equivalent, O. K. DURA-CROME for shearing hot or cold plate steel up to 1¼ in. or equivalent, O. K. STANDARD for average runs and heavy plate shearing.

GANG SLITTERS are made to the same quality and specifications as O. K. SOLID STEEL SHEAR BLADES. Precision ground to ± .0002 tolerances on thickness, diameter, and bore—extremely high finish.

The **OHIO KNIFE** Co.
CINCINNATI 23, OHIO, U.S.A.

Versatility SPEEDS HANDLING —LOWERS COSTS

KRANE KAR lifts, transports, and positions the load. No need to maneuver the vehicle—swing the 'live' boom from side to side and up or down, by power, with full load on hook. KRANE KAR hauls trailers, spots cars, loads and unloads freight and cargo; moves, piles, and stacks loads of all shapes and sizes safely and efficiently. Ideal for maintenance and repair operations. KRANE KAR versatility speeds production output, lowers handling costs. Write for Catalog No. 58.

USERS: Basic Magnesium; Monsanto Chem. Co.; Pullman Co.; Standard Oil; General Motors; Chrysler Corp.; General Electric; Otis Elevator Co.; Boeing Aircraft; E. I. DuPont de Nemours; etc.

Agents in the Principal Cities

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR
TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 851 63rd ST., B'KLYN 20, N.Y.

ing & Exploration Co., Ltd., told members of the Canadian Institute of Mining & Metallurgy that the Sawyer Lake deposit in central Labrador had been probed by diamond drilling in exploratory holes to a depth of 220 ft. with the drills still in ore.

Analyses of ore samples yielded an average of 68.4 pct iron with phosphorus, sulphur and silica contents very low. Open at both ends, the tonnage of this high grade, lump quality, premium ore was indicated by the work done at that time to yield a minimum of 30,000 tons of ore per vertical foot or an indicated minimum tonnage of approximately 6 million tons.

Discovery of nine deposits of iron ore and three outcrops were reported in the Newfoundland-controlled area, some as long as 3300 ft. and of appreciable width. The average grade of the ore was 63.2 pct combined iron and manganese. Much of it was reported of lump character and all deposits except one of Bessemer quality.

In addition, a deposit of silicious iron ore was discovered at Lake Attikamagen, and reserves indicated are measured in millions of tons with iron grading 39 pct and silica 27 pct.

In the new Quebec area, 15 deposits of iron ore were reported, one of which was 3900 ft long.

There is ample waterpower in the area to meet the requirements of any large mining operation, as Grand Falls, one of the largest undeveloped sites in the world, lies within the Newfoundland-controlled area. A power survey of the falls has indicated that the minimum hydro-electric energy available is 1,250,000 hp. This site is approximately 90 miles southeast of the Sawyer Lake deposit, and 140 miles southeast of the main area of deposits.

The transportation problem is not particularly difficult, as a railroad could easily be constructed along the Romaine River Valley from the Gulf of St. Lawrence to the area. There is a possible shorter route to the deposits from Hamilton Inlet, but the route to the St. Lawrence is favored because of the possibility of year-round shipping. There are excellent harbors at all possible railroad termini.

Net Income Declines $1.2 Million in 1945, Bethlehem Reports

New York

• • • **During 1945 170 ships** were completed and delivered by Bethlehem shipyards, according to the annual report of the Bethlehem Steel Corp. These include cruisers, destroyers, LST's troop transports and cargo vessels. In addition 6755 vessels were converted, repaired or serviced.

Steel plants for the same period averaged 91.7 pct of rated steel capacity compared with 102.8 pct in 1944, or 11,831,610 net tons for the year just closed and 13,262,348 net tons in 1944.

Estimated net income of the corporation for the year 1945 was $34,947,116, as compared with $36,167,723 for the preceding year. Net amount of business booked during the year is estimated at $554,000,000. In 1944 $878,000,000 was booked. Unfilled orders on hand Dec. 31, 1945 amounted to $468,000,000 as compared with $1,240,000,000 on Dec. 31, 1944.

Monthly average number of employees in 1945 was 202,095, as compared with 261,481 in 1944. Average earnings per hr of these workers was $1.401 in 1945 and $1.376 in 1944. Average work week for the year was 42.3 hr, down 2.9 hr from that of 1944, namely 45.2 hr. Total amount of wages and salaries paid during the year was $624,337,285.

1945 Net Earnings Drop

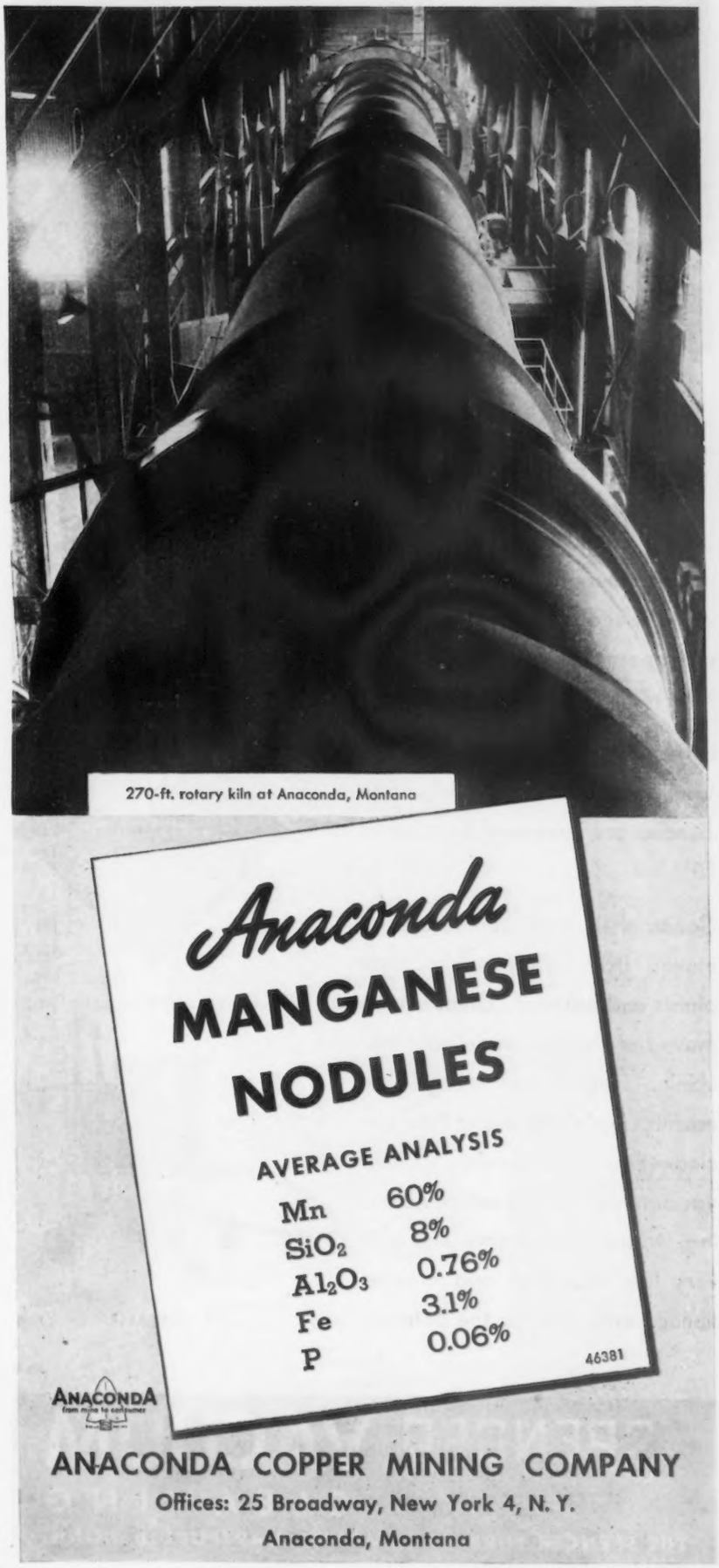
Sidney, Ohio

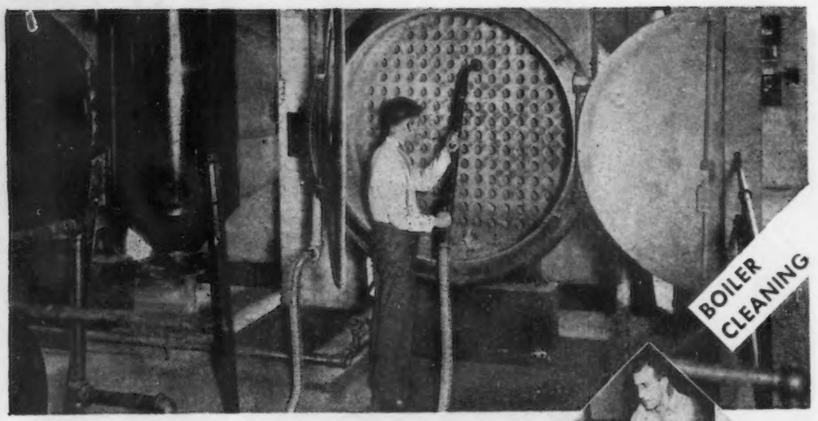
• • • **Wendell E. Whipp,** president, Monarch Machine Tool Co. has reported net earnings for 1945 of $560,226, after provision for federal taxes and renegotiation. Gross sales for 1945 were $14,775,426, as compared with $16,444,372 for 1944.

Net is equal to $2.66 per share on the 210,000 shares outstanding, and compares with net earnings for 1944 of $708,216, or $3.37 per share.

In his letter to shareholders, Mr. Whipp said the plant is operating on a curtailed production basis due to lack of essential materials.

"The wave of work stoppages



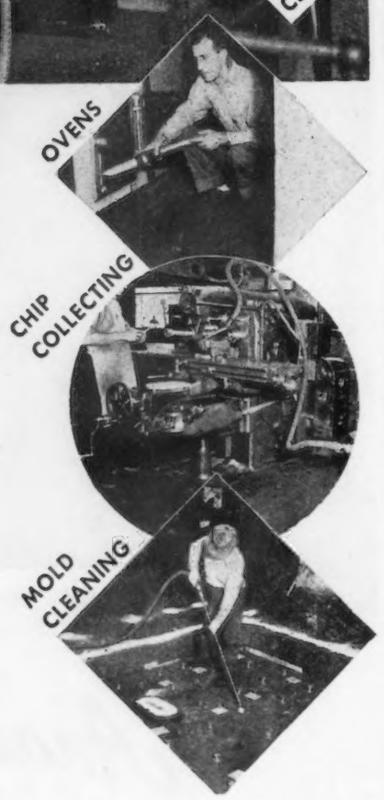


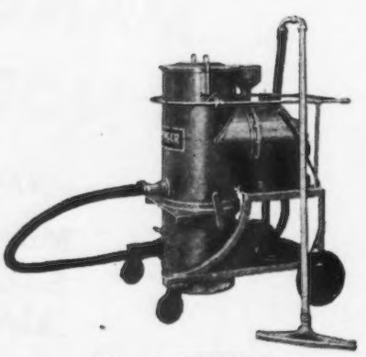
Special USES FOR SPENCER VACUUM

In any plant, there are a dozen places where Spencer Vacuum could speed up and improve special operations, and at the same time reduce costs.

In the boiler room, soot is removed from tubes without blowing. Efficiencies are increased as much as 20%.

Cocoa shells and crumbs are removed from ovens in chocolate plants and bakeries. Chips are removed at the tool on delicate machining operations. Molds for castings weighing many tons are cleaned with a special Spencer vacuum tool. All this without blowing, without loss of time and with very low operating and maintenance costs. Ask for the Bulletins.





1½ H.P. PORTABLE

276-D

SPENCER HARTFORD VACUUM CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

throughout industry and particularly in the plants of many of our principal suppliers," Mr. Whipp stated, "is making it increasingly difficult for us to continue efficient manufacturing operation. In the meantime, orders for new machines continue and our backlog of unfilled orders is constantly rising.

"During the past month our new postwar machines, now on display at our factory, have been announced to the trade press and for the past two weeks a continuous sales convention has been held for our own direct salesmen, as well as salesmen of all our dealer organizations throughout the United States and Canada."

Youngstown Net Profit Dips Slightly in 1945

Youngstown

• • • **Youngstown Sheet & Tube Co.** has reported net profit for 1945 of $7,512,250, which compares with $7,944,922 for 1944, and $8,037,441 for 1943. Net sales and revenues, less cost of sales and other expenses, were $33,340,748.

According to a preliminary consolidated income statement issued by the company, no provision was made for any liability in renegotiation of government contracts and is subject to readjustment.

The report showed that $6,500,000 was provided for federal taxes, compared with $11,375,000 in 1944 and $18,400,000 in 1943. Provisions included $5,604,000 for normal income and surtax, and $3,800,000 excess profits tax, less a reduction of $2,904,000 in federal income taxes due to accelerated amortization of emergency facilities applicable to prior years.

For depletion of minerals, depreciation of plants and equipment, and amortization of emergency facilities, the company provided $16,802,498, which included $4,485,636 accelerated amortization of emergency facilities applicable to prior years.

Interest on funded debt, premium and unamortized expense on bonds retired and other interest charges amounted to $3,126,000, compared with $2,180,128 in 1944 and $2,326,396 in 1943.

Recommends Basis In Fundamental Sciences For New Metallurgists

Chicago

• • • **Young men who are looking** for the shortest path to employment as metallurgical engineers in the steel industry should burn academic oil especially on the fundamental sciences as preparation for postwar jobs, according to E. C. Wright, assistant to the president of National Tube Co., United States Steel Corp. subsidiary. In a paper presented here today before the Mineral Education Div. of the American Institute of Mining & Metallurgical Engineers, he cited federal government figures showing that there will be thousands of opportunities for technical men in American industry.

Graduates of standard engineering colleges generally prove readily adaptable to the practical phases of steel metallurgy, Mr. Wright observed from his 25 yr of training experience. But he warned that engineering graduates sometimes tend to bring with them more generalities on applied industrial engineering than needed in the steel industry.

"Engineering students seem more suited to actual work in steel plants and in general are better able to grasp a knowledge of operations observed," Mr. Wright explained. "Moreover, graduates of engineering schools have a superior training in physics, mathematics and engineering, but even then it has been a general and continued observation that most students employed had inadequate training in such fundamental sciences as physics, physical chemistry, thermodynamics, and mathematics higher than simple calculus, all of which are essential to good work."

The demand for metallurgical engineers will undoubtedly continue to grow, Mr. Wright predicted, as many companies have announced plans for new or enlarged laboratory facilities and greatly increased appropriations for postwar research. He quoted Dr. Vannevar Bush, head of the Office of Scientific Research & Development, as recommending federal government research at a cost of $35,000,000 for the first year after the war and rising to $122,-

The power of one of our customers "goes up in smoke" . . . the product is cigarette paper. This great paper mill manufactures miles of cigarette paper—as soft and thin as a butterfly's wing yet tough as the flax from which it is made.

In 1939 our engineers had to solve the tremendous problem of power transfer. As a result, Chas. A. Schieren 8-inch waterproof leather belting was installed between the 30 HP motors and individually driven beaters. Many of these belts have never been shortened since . . . and they are still running on a 24-hour basis 6 to 7 days per week—in spite of the unusually moist conditions.

Whether your product "goes up in smoke" or your power disappears that way, call in Schieren. Our background of 75 years in industrial servicing is your assurance of belt installations to fit your special needs . . . small, large or unusual.

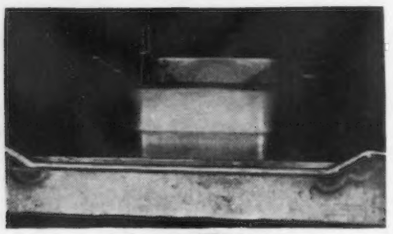
Schieren Leather Belts are rugged. They're made to resist water, oil, wear and other hazards. Their sure grip on the pulleys means a full RPM output. The cost of Schieren Leather Belts is no higher than for standard quality belts. And you save their original cost many times over in reduced maintenance charges and minimizing of costly shutdowns—let us quote on your belting requirements.

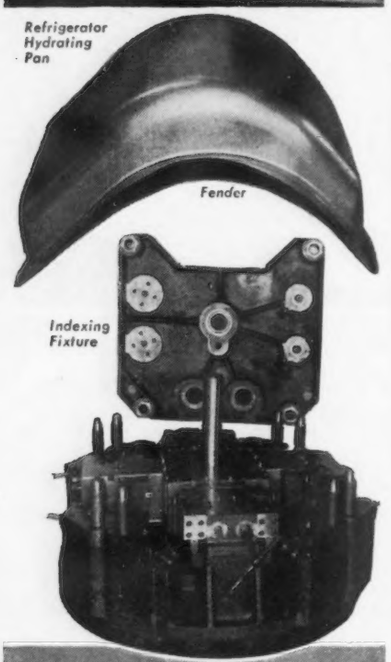
Let us send you free book on SHORT CENTER DRIVES -data which show how pivot bases give

1. Automatic Belt Tension
2. Boost Overload Capacity of Drives.
3. Eliminate any possibility of slip.
4. Increase machine output.

We are national distributors of Rockwood Bases.

CHAS. A. SCHIEREN CO.
LEATHER BELTINGS • SPECIALTIES
HYDRAULIC PACKINGS
36 FERRY STREET, NEW YORK 7, N. Y.
60 Front Street, W. Toronto, Ont.





DOUBLE - TREBLE AND DOUBLE AGAIN

Because of its unusual qualities cast-to-shape dies of Strenes metal outserve dies of more conventional metals many times over.

That is a "large" statement but the evidence may be obtained direct from builders of

Refrigerators, Stoves, Motor Cars, Trucks, Tractors, Grave Vaults and others with drawing and forming operations to handle.

Have us identify a few users—you can contact them for the "low-down" on Strenes metal as a tooling program expediter.

The ADVANCE FOUNDRY COMPANY
100 SEMINARY AVE.
DAYTON 3, OHIO

Strenes METAL
FOR DRAWING AND FORMING DIES

000,000 a year at the end of 5 yr, in addition to regular expenditures at the peacetime level. Meantime, as Mr. Wright pointed out, engineering colleges have produced very few graduates in the war years.

By the present training schedule at least five years of practical experience following four years in an engineering school is desirable in developing a good metallurgical engineer, Mr. Wright stated as an argument for closer co-ordination between colleges and the steel industry. He advocated a co-operative program whereby after their first academic year engineering students might spend each summer in practical steel plant work. Thus, he said, a finished, experienced technologist could be developed within a seven-year cycle instead of nine years.

"The training of technical graduates has fairly well crystallized into a routine, and satisfactory results are being obtained in developing such men," asserted Mr. Wright. "It has been found that the finished metallurgical engineer needs thorough understanding of routine analytical chemistry and physical testing procedure, a good knowledge of statistics, ability to handle men, a thorough knowledge of the processes and operations in the plant in which he works and, finally, ability to analyze difficulties and conduct research work."

"At various times attempts have been made to classify college graduates by means of standard intelligence and aptitude tests, but the results were usually unreliable as an index of the applicant's qualifications," Mr. Wright recalled. "It is believed that this was largely due to the inexperience of the examiners. Quite probably engineering colleges could perform this function in a much better manner. During the war the Army and Navy have used these means of selecting men for a multitude of specific skills and claim great success with these procedures."

Mr. Wright advocated in his paper a clear-cut college-industry training program covering at least 10 yr for recruiting undergraduates and graduates each year, standard apprenticeship courses, with definite pay rates and working hours and a training program best fitting each industry. Co-operative arrangements should be made with selected colleges to insure that apprentices be obtained from a number of different schools, he said, and every effort should be made to mobilize undergraduates for summer and vacation work as early as possible in their college courses. By these means, predicted Mr. Wright, the steel industry will have available in a few years a sound reservoir of metallurgical engineering talent for executive and control posts, as well as for key positions in sales engineering.

Spring Manufacturer Gets High Alloy Iron Foundry Facilities

New Kensington, Pa.

• • • **A high alloy** cast iron jobbing foundry is about to be established in the Pittsburgh area when the Union Spring and Mfg. Co. here opens cast iron foundry facilities in the heart of its steel foundry making use of much of its equipment and personnel. The company is a railroad spring manufacturer with a steel foundry catering to the railroad industry.

Believed to be unique among cast iron producers, the project will concentrate on the high alloy irons such as Ni-Resist, Ni-Hard, the Invar type of cast iron containing up to 36 pct of nickel, and others. These alloy irons are used for applications requiring specialized resistance to wear and abrasion, heat and corrosion or special characteristics of thermal conductivity and expansion, electrical and magnetic properties.

Production of the alloy iron foundry is awaiting the delivery of two small Ajax-Northrup electric induction furnaces.

The company had been contemplating the establishment of a stainless steel foundry in conjunction with its carbon and low alloy steel castings production until a market survey disclosed that the field was overcrowded and highly competitive. Therefore plans were modified so as to begin the production of alloy cast irons. The iron foundry will be managed by Fred S. Price, manager of the company's alloy iron department.

AFA Defect Committee Lists Common Causes Of Poor Iron Castings

Chicago

• • • **The committee on casting** defects of the American Foundrymen's Assn. recognizes 29 separate defects as causing a casting to be either scrapped or salvaged, W. A. Hambley, foundry metallurgist, Allis-Chalmers Mfg. Co., told the Chicago chapter of AFA recently.

Faulty pouring contributes to 25 different defects, leading the list. It is the sole cause of defect No. 28, poured short, listed by the committee. There are only four defects which it is assumed that pouring does not contribute to or cause: No. 8, stickers and rats; No. 10, ramoff or ramaways; No. 26, broken castings; and No. 27, wrong cores, cores set wrong or no cores.

Taking casting procedure chronologically, design can contribute or cause 18 defects; pattern equipment, 20; flask and rigging, 18; gating and risering, 20; sand, 22; cores, 21; molding practice, 24; metal composition, 13; melting practice, 13, and miscellaneous factors, 13.

The committee lists metal composition as the main cause or a contributing factor to 13 gray iron casting defects, Mr. Hambley said. He pointed out that the committee did not claim factors listed in this category as the main cause of any defect. Under each defect is listed what is considered the most probable cause as well as factors which in unusual instances could be a cause.

Using the committee's numbered designations, defects of which metal composition is a proximate or contributing factor—so-called "iron defects"—were listed with their causes as follows:

(1) Blows. Presence of other metallics such as aluminum, antimony, tin, babbitt metal, bearing metal.

(2) Inclusions. a—Wrong composition for the section thickness, promoting metalloid segregation. (Mr. Hambley rejected this as a cause of a defect stating "It is illogical to try to say that MnS or phosphorus will cause a segregation that will in itself appear as an inclusion whereby the casting is defective.) b—Alloy or addition material improperly dissolved. This is normally due to lack of temperature or use of wrong inoculants or addition material.

(11) Metal penetration. Due to a required composition which requires a high pouring temperature.

(14) Hot tears and cracks. a—Wrong composition for the application or section. b—Composition having too high contraction value. Where the composition is specified and met yet has too high shrinkage for the design.

(16) Mass hardness. a—Carbon equivalent too low for the section. b—Excessive use of carbide stabilizers. c—Insufficient graphitizers or inoculants used.

(17) Open grain structure. a—Carbon equivalent too high for the section. b—Phosphorus too high for the application. c—Lack of carbide stabilizers. d—Excess use of graphitizers.

(18) Shrinkage cavities and depressions. a—Chemical composition unsuited for the section; carbon equivalent out of balance with section; combined carbon too high for section; phosphorus too high; excessive ladle additions; alloy content unsuited for sections.

(19) Warped. Warpage is influenced by high combined carbon.

(20) Hard spots, areas or chilled spots. a—Carbon equivalent too low for section. b—Combined carbon too high for section. c—Excessive use of carbide stabilizers.

(22) Misruns and coldshuts. a—Fluidity too low; too high or too low carbon equivalent for section; excessive use of carbide stabilizers; and excessive use of graphitizers.

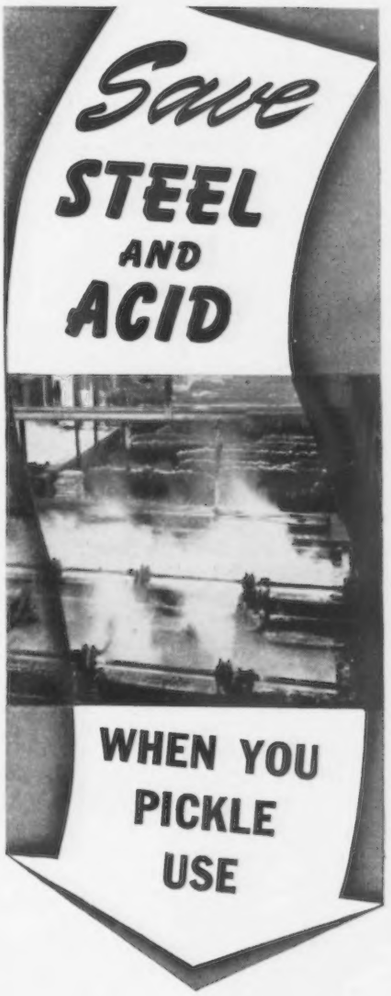
(23) Scars, seams and plates. Iron not fluid enough (see 22a).

(24) Inverse chill. a—Carbon equivalent too high. b—Presence of nonferrous materials (see No. 1).

Bullard Cuts Out Bonus

Boston

• • • **New England Wage** Stabilization Board, sitting here, has approved an application by the Bullard Co., Bridgeport, Conn., to discontinue a 10 pct attendance bonus which has been paid to eligible members of the company's 3000 employees since May 1942. The attendance bonus was paid in war savings stamps and bonds, and was never considered as part of regular wages.



CHEMICALS ACP PROCESSES

RODINE inhibited acid baths remove scale without dissolving clean metal—less acid is consumed. A better finished surface is produced.

Our Technical Department will gladly assist in adapting ACP Products and Processes to your manufacturing requirements. Address Dept. E-3.

American Chemical Paint Co.
AMBLER ACP PENNA.

Foundrymen Awarded Pins for 50 Yr Term

Canton, Ohio

• • • **Foundrymen from** nine plants in this district were recently awarded pins signifying 50 yr service in a foundry by the Canton district chapter of the American Foundrymen's Assn.

K. F. Schmidt, United Engineering & Foundry Co., presented pins to 25 foundrymen, whose average length of service is 53 yr. John Bonnot, factory superintendent of Bonnot Co., claimed the longest period of service, 63 yr.

Close on Mr. Bonnot's heels were: Ollie Shaeffer and William Potts, the Deming Co., Salem, Ohio, with 59 and 58 yr respectively; and Tom Betz, United Engineering & Foundry with 57 yr.

Pin recipients and their length of service included: Bonnot Co., Cyrus Jackson, 53 yr; United Engineering & Foundry Co., Robert Hug, 54; Fred Needham, 56, and George Hunter, 53; Canton Pattern & Mfg. Co., Theodore M. Dubs, 54, and John Bellinski, 51; Union Metal Mfg. Co., Alfred Vose, 55.

Machined Steel Castings Co., Alliance, William Devine, 54 yr; John Barnett, 53; John Boyle, 52; Ed Fletcher and Harry Wisner, each 51 and Harry Towns and William Apgar, each 50; American Steel Foundries, Alliance, Frank Lang, 54, and John Ward 53.

Deming Co., Salem, Charles Geiger, 55 and William Mullet, 52; Pitcairn Co., Barberton, Charles P. McCafferty and Watson Johnson, each 53, Electro-Melt Castings Co., Barberton, Christian Kratt, 52.

Discussion leaders at the meeting were: C. W. Traynor, Union Metal Mfg. Co., cast iron; Carl Fornwalt, Atlantic Foundries, Akron, steel; Mr. McCafferty, nonferrous and Millard B. Hoffman, Norris Elliott Co., Columbus, time and motion study.

AFA Nominates S. V. Wood for President

Chicago

• • • **S. V. Wood, president** and general manager, Minneapolis Electric Steel Castings Co., Minneapolis, has been nominated for the presidency of the American Foundrymen's Assn. The nomination was announced following a recent meeting here of the AFA nominating committee. Mr. Wood is currently serving as vice-president of AFA and previously served as a national director of the group.

Other nominations announced at the meeting, and which will be voted on at the association's annual convention in May, include Max Kuniansky, vice-president and general manager, Lynchburg Foundry Co., Lynchburg, Va., who was nominated for the vice-presidency of the foundry group, and the following who were proposed for directors: H. A. Deane, vice-president in charge of operations, Brake Shoe & Castings Div., American Brake Shoe Co., New York; S. C. Wasson, manager, National Malleable & Steel Castings Co., Chicago; B. L. Simpson, president, National Engineering Co., Chicago; J. E. Kolb, pattern shop superintendent, Caterpillar Tractor Co., Peoria, Ill., and H. G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Paterson, N. J.

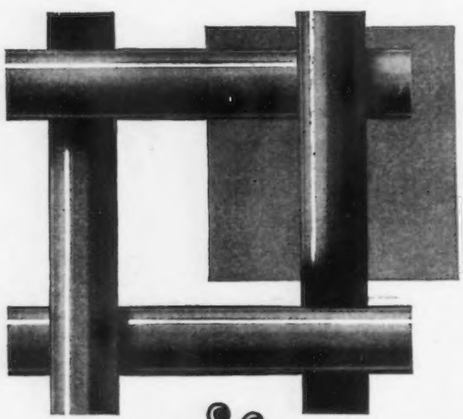
Ford Buys Back Plant

Dearborn, Mich.

• • • **The Ford Motor Co.** has reacquired its branch plant at Norfolk, Va., purchasing it back from the U. S. Navy, to which it was sold in 1942 at government request.

The company plans to spend $1,500,000 in addition to the purchase price, for plant modernization and new equipment. Before the war it was a major branch assembly unit for Ford cars and trucks, and will be reequipped for this purpose. After reconversion is completed, by June 1, approximately 2000 persons will be employed.

The plant consists of a modern, single story brick and concrete assembly building, a power house, oil house and pump house. It is located on a 45-acre tract near Norfolk.



ABRASION NEEDN'T BE A PROBLEM IN wire cloth for Sizing and Separating

LARGE PARTICLES—*(Stone, Lime, Gravel, Coke).* "Buff-Aloy" Abrasion Resistant Wire Cloth. Special composition steel wire normalized and processed to reduce wear from abrasion, hence more durable. Proper crimping control lengthens screen life and reduces costs.

SMALL PARTICLES — *(Light Minerals, Sand, Refractories, Abrasives).* "Buffalo Stainless Steel" Wire cloth in bolting or market grades. Rustproof. Fast screening with long life in all weather.

Request "Buff-Aloy" Folder 601, Stainless Steel Bolting Grade Folder 590, or Stainless Steel Market Grade Folder 596

Buffalo WIRE WORKS CO., INC.
ESTABLISHED 1869 AS SCHEELER'S SONS

456 TERRACE BUFFALO 2, N. Y.